

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

[The MINING JOURNAL is Registered at the General Post Office as a Newspaper, and for Transmission Abroad.]

87.—VOL. XLIII.

LONDON, SATURDAY, SEPTEMBER 20, 1873.

PRICE.....FIVEPENCE.
PER ANNUM, BY POST, £1 4s.

Original Correspondence.

FOREIGN MINING AND METALLURGY.

Copper appear to have rather revived at Paris, and quotations are tending upwards. Chilean bars are quoted at 95s.; tough cake, 94s.; and Corocoro minerals at 92s. per ton. There has been no great amount of business in copper at Havre. The Marseilles copper market, but prices have been at the same time well maintained. The German copper markets there has been rather quiet, but at the same time prices have experienced little change. The Paris tin market has been quiet. Banca, delivered at Paris, has made 148s.; ditto Straits, 146s.; and English, at Havre or Rouen, 141s. per ton. At Marseilles the tin market is quiet; Banca has been quoted at 140s. per ton. The Rotterdam market; Banca has brought 141s. 6d. The article has been much neglected. Quotations for lead have been advancing at Paris; but has not, however, displayed much animation; French lead 23s. 4s.; Spanish, 23s. 8s.; English, 22s. 16s.; and Belman, 23s. per ton. Lead has been rather better supported in the Marseilles market; in consequence of the "events" the arrivals of Spanish lead have much fallen off upon the Marseilles centre. The German lead markets have been quiet. Quotations for zinc have sensibly advanced at Paris; delivered at Havre, has brought 28s. 4s.; and other goods delivered at Havre, 27s. 12s. per ton. Upon the Marseilles prices have also been tending upwards. At Breslau the market has been very firmly maintained.

The metallurgical industry appears to be generally in a feeble state. Some transactions in rails for the maintenance and repair of permanent way of the great companies assure work to rolling mills, but trade in rails can scarcely be said to have its ordinary current. Merchants' iron is neglected even at 10s. 16s. per ton; there are few orders, and many rolling mills are almost idle. As a consequence of this, refineries are in a very little demand; coke-made pig brings 4s. 12s. per ton, while the quotation for charcoal-made is 6s. 12s. per ton; these are the quotations, it should be observed, of the group. In the Meurthe-et-Moselle coke-made pig has brought 4s. 8s. per ton, while ordinary white pig has brought 4s. 4s. per ton. Casting pig has experienced a demand; this animation is regarded, however, as only as the foundries usually experience at this season of the year. Winter articles, and have accordingly to lay in supplies of machine shops and railway plant construction establishments pretty well off for work, casting pig finds a rather immoderate demand. The Val-d'Oise Foundries Company (Société) has decided to increase its capital to 100,000l. The pig and castings into France in the first six months of the year were officially returned at 69,999 tons, against 72,677 tons in the corresponding period of 1872, showing a diminution of 34 per cent. The imports of iron and plates into France in the first six months of 1873 were 32,000 tons, instead of 23,000 tons in the corresponding period of 1872, showing an increase of about 33 per cent. The total exports of iron from France in the first six months of 1873 amounted to 127,000 tons, instead of 159,000 tons in the corresponding period of 1872, showing a diminution of nearly 20 per cent. These figures illustrate the precarious condition of the metallurgical industry. On the other hand, there is a constant production of steel. The imports of minerals into France in the first six months of this year amounted to 368,000 tons, as compared with 297,000 tons in the corresponding period of 1872, showing an increase of nearly 40 per cent. The minerals imported are almost exclusively manganese and iron ores, adapted for the manufacture of steel.

The condition of the Belgian iron trade is not completely satisfactory. A sensible improvement has been established. A slight increase in England and a modest return of orders to the Belgians have sufficed to strengthen confidence which had been shaken by the late depression. There is a hope of a better return of business in the near future. Some of the iron and some demand for pig do not really, however, the aspect of affairs. Offers of work are returning, but the terms offered are so low that it is extremely difficult to accept them. Some transactions have been noted in merchants' iron, at 8s. per ton. Rails have still more variable quotations; shipment refuses to accept lower rates, and another consequence is, it is difficult, and even dangerous, to reduce one's price, and some firms seem to consider that it is less to go on working even at a slight loss. The workmen of the Belgium iron trade, belonging to the Belgian Railway Company, and those of the Haine St. Pierre Ironworks Company, refused to work—at any rate, they recently went on strike took place because the men refused to allow the company to employ such men as were found to suit them. Refineries, iron, is maintained between 4s. 12s. and 4s. 16s. per ton; as regards other articles there is little new to report. The introduction of a new Customs tariff adopted by Germany, numerous expectations are expected to be received from that empire; some of the French coal trade may still be said to be vague. The Paris coaldealers have been laying in winter stock, and in doing so they have been rather aided than otherwise by the proprietors, who have made their deliveries with promptitude, notwithstanding the absence of stocks, the scarcity of work, and the scantiness of means of transport which is alleged to be the coal which comes to hand at Paris is obtained from all sources, especially English and German; the conditions which

cause a preference to be given to these descriptions are becoming more decided every day. The coal syndicate formed at Lille has resolved to make purchases in England, and apparently without much regard to price; the object seems to be to compel French coalowners to reduce their rates by increasing external supplies. The Prefect of the Pas-de-Calais has called upon the concessionaires of the Ferques Mines, which have remained unworked for more than 20 years, to resume their working within a period of two months; if this notice should not receive due attention, the withdrawal of the concession will follow, by virtue of the laws of April 21, 1810, and April 20, 1838.

The administration of the Belgian State Railways has found it advantageous to do business from hand to hand for English coal, which costs 2s. to 2s. 6d. per ton less, delivered at various points of consumption. Coal may be said to find, upon the whole, a ready outlet both by water and by railway in Belgium, and stocks which existed at various points have been absorbed; it should be remembered, however, that it is at this period of the year that winter stocks are generally laid in. The miners of the two Herve collieries have suddenly left work, as they require additional wages; they now receive on an average 5s. 3d. per day, and they want 6s. per day. The managers of the collieries have decidedly refused to comply with the men's demand, and, thanks to a rather important stock, the collieries will be enabled to supply business requirements for some time to come. The Monceau-Bayemont and Chauw-a-Roc Colliery Company will repay, Oct. 1, 12s. upon each share 20l. paid, together with interest at the rate of 5 per cent. per annum. This is the policy adopted by the company to advantageously employ the exceptionally large profits realised during the last few months.

THE MINES AND MINING DISTRICTS OF UTAH.

THE DISTRICTS OF THE WAHSATCH RANGE.

THE COTTONWOODS—(continued).

Having disposed of the Tunnel locations, I will now proceed without further preliminary to consider the principal mines of Little Cottonwood, as briefly and comprehensively as possible. "Place aux dames," and especially as one so renowned enters upon the scene. The Emma Mine is situated on Emma Hill, on the northerly slope of Little Cottonwood Canyon, about 10 miles from the mouth of the canyon. It was discovered in 1869 by James F. Woodman, recorded Feb. 25, 1870, and is to-day one of the successfully operated mines in the Territory, notwithstanding so many reports to the contrary. It was the first fully developed mine in Utah, and the results obtained in its development have been the means of inducing thousands to explore the rich belts of the Wahsatch Range, and bring to light their vast but hidden treasures. It is probably one of the most extraordinary mines in the world, and its discovery has given an entirely new impetus to mining in general. The Emma contains 2400 linear feet by 100 ft. in width, and consists of deposits of very rich galena ores, mainly carbonates and oxides of lead, carrying silver, and at a great depth sulphurets are found in large quantities. Situated in the dolomite, the developments of the mine fully demonstrate that this class of lime rock is not only rich in silver, but also carries a large percentage of lead. The first discoveries were not at all calculated to justify the present results, or to raise very extravagant expectations; and, in fact, so little was known of its real worth that a practical miner deemed it a waste of time to work upon it for the simple remuneration of a certain number of feet. But in the end of the year 1869 a vast body of rich mineral was struck at a depth of 127 ft., which created an entire change in the aspect of the property. Subsequently the ores were shipped at Swansea, Great Britain, and the assay value of several returns averaged \$118 per ton, but still its true character was not appreciated, as that same winter a half interest in the mine could have been purchased for less than \$3000. But as further developments were made its real value became evident, and in the spring of 1870 \$30,000 was paid for one-sixth interest. Afterwards the mine was sold to an organised company, called the Emma Silver Mining Company of Utah, who sold again at a greatly advanced price to some New York capitalists. In August, 1871, a Government patent was obtained for the mine; and in November of the same year the New York Company disposed of it to the present owners, the Emma Silver Mining Company of London (Limited).

The Emma has been worked from the surface down without cap, and it is not possible with the present developments to trace the mine either on the surface or at a depth other than that of the workings, which show the head of the mine to be as given on the diagram on the published map of Little Cottonwood for 1873, but new developments are continually being made. The mine has an elevation of about 8500 ft. above the sea, and as it is also situated at a great elevation above the level of the canyon, it was confidently thought that no trouble could ever be occasioned by water; and consequently the flooding of the mine in the spring of 1872 found the company totally unprepared for any such contingency. Should a similar catastrophe occur in the future, however, the two steam-pumps which have been since erected will be sufficient to keep the mine dry. The improvements of the Emma Company are first-class in every particular, the buildings commodious and substantial, and the arrangements very complete for winter work. The many buildings, the tunnel of 375 ft., the steam hoisting machinery, and the tramway for the conveyance of waste material from the mine, all show that the company have been most enterprising and lavish of expenditure in everything pertaining to the successful development of the property, and have also inaugurated the most important improvements in the district. The quantity of ore taken out of the mine during the years 1870 and 1871 was about 5000 tons, and in 1872 more than 10,500 tons, a daily average of 35 tons. The assays show an average value of \$100 of all ores, a proportion of 100 ozs. of silver, and 40 per cent. lead to a ton of ore. A small portion of the ore has been sent to local smelting works, but the greater part has been shipped direct to Swansea.

I cannot refrain from venturing a few remarks here in relation to the many conflicting reports which have gone abroad during the past year about this mine, and also in regard to the Flagstaff, which is situated in the same district. There are not, perhaps, any two known mines that have obtained so much notoriety in so short a time, and about which so many absurd rumours have been circulated, especially in the case of the Emma. It has been repeatedly and emphatically

asserted that the Emma was virtually worked out, that it was entirely worthless when placed upon the London market, that it was sold by means of false representations, and consequently its sale for so large an amount was a clear swindle, perpetrated knowingly upon its present owners. And although these absurd reports have obtained a certain amount of credence, and have had a depressing influence upon the stock, there is no good reason whatever for presuming that the real value of either this mine or the Flagstaff has depreciated in the least. It may be admitted that British investors in American mines have not always had their expectations realised, and in some cases may have been losers by their adventures, but where failures in investments have occurred it has not been because the mines were worthless by any means; but it has been the result of a combination of circumstances in which English purchasers perchance have been as much to blame as American vendors. One instance, for example; an American speculator secures the bond of a good mine for a stipulated sum, proceeds to England, and secures the services of a promoter, through whom the property is sold. The speculator, or agent, as he terms himself, has been instructed to place the mine upon the market at a fixed price—usually its full value—and a certain commission promised him when the property is sold; but notwithstanding these arrangements, it is often sold for more than double the stipulated sum, which advance is quietly pocketed by the speculator and promoter, and for this the American owners are not responsible. Then, when the mine has been purchased at an extravagant price, it is overstocked, and this has been the ruin of a large number of good mines; for it is an impossible thing for a mine to pay dividends on a sum perhaps more than double its real value. This point is obvious, and worthy of the consideration of mining companies in general. Then, it is often the case that the management is neither prudent or economical, large salaries being paid to a number of incompetent and inexperienced officers for doing the work which could be done by one or two capable men, and this financial pressure assists very materially in ruining the company. The attention of stockholders is particularly directed to this point. But to return to the Emma, from facts lately ascertained, this mine is as valuable as it ever was, and to assert that it never was of any value is a piece of presumption that cannot be sustained by any past experience. What that value is in dollars and cents is not my province to define, but over \$1,000,000 worth of ores were taken out in 1872, and although the yield of this year has not been so great in proportion, it must not be taken as an assumption that the mine is failing, or to use an Americanism, is being "played out." Lately the shipments of ore have only aggregated about 100 tons per week, but as the water from the melting snows disappears from the lower levels the quantity will probably increase to 60 tons per day. And all the ore extracted lately is of a high grade, as a carload of it assayed recently at the Salt Lake sampling works showed 500 ozs. of silver to the ton. There is also nearly 10,000 tons of lower grade ore on the dump, which is being concentrated by the jigging process, that will yield a very fair profit. It was rumoured lately, and has since been confirmed, that another body of ore has been discovered as rich and promising as any yet taken from the mine, so before very long it is anticipated that the Emma will very substantially convert those absurd rumours that have been circulated by those who were totally ignorant of facts in the case, and also by those who wilfully misrepresented facts to subserve their own interests, unscrupulously disregarding all business honour and rectitude. It is to be regretted that the Emma Mining enterprise has been the prey of some daring and unscrupulous speculators, and also that the management, both at home and abroad, has not always been as practical and capable as might be desired. The present resident manager, however, Mr. Atwood, is efficient and competent, and will do all in his power to promote the interests of the company.

The Flagstaff Mine was located in March, 1870, and ranks among the most important in Little Cottonwood. It is situated on Emma Hill, and contains 2600 by 100 ft. The property is owned by an English company, and includes the Maxwell Tunnel and three furnaces. The works consist of various shafts and levels, which are extended all the time. The discovery shaft is down over 650 ft. on inclination of the vein, and the ore ground, explorations, and developments are continuous. The country rock is limestone, and the vein matter regular, and nearly always productive, consisting mainly of carbonates and oxides of lead and iron carrying silver, with a small percentage of gold. The average assay value of the ore is from 70 to 100 ozs. of silver, and 50 per cent. lead per ton, and it is all smelted by the furnaces belonging to the company, which are situated at the mouth of the canyon. These furnaces are run by water-power, the company having control of Cottonwood Creek, and the hot-blast furnace is the only one in the Territory. The tramway at the mine and the buildings in the vicinity show that the management is both economical and enterprising, and the results of last year prove that the mine has been most successfully worked, more than 10,000 tons of ore having been extracted in 1872. This present season has also been very successful, the yield of ore sometimes reaching 100 tons in one day. The work of development is constantly increasing, and from present indications will yield a handsome dividend to the shareholders for many years to come. And one word here upon the subject of dividends. The system adopted of declaring a monthly dividend on American mines owned and incorporated in England is very much to be deprecated, as it allows no opportunity for making up what is termed short workings; and in the winter season, when the canyon road is often impassable for several weeks, ores cannot be transported or worked at the smelters, and consequently there is no return on which to declare dividends. The English system of three, four, and six months dividends is far superior, as it gives sufficient time to make up for unavoidable delays that will occasionally occur in mining operations, and at the same time tends to increase the dividends above those paid monthly. English companies operating in American mines would find it to their advantage to adopt this system. If it were in general use the saving on the Emma and Flagstaff mines alone would be from \$25,000 to \$50,000 annually to each of these companies on the remittances to England. And now no more digressions.

The Lavinia Mining claim was located in Nov., 1869, and is situated near the head of Little Cottonwood Creek, on the south-west slope of the divide between Big and Little Cottonwood Creeks, about a mile above the Emma Mine. It contains 2400 by 100 ft., and the vein matter is nearly perpendicular, and the wall rock of

limestone is very regular. The average assay value of the ore is \$50 in silver per ton, and 25 per cent. in lead. The improvements consist of two tunnels, and two shafts of various depths, with one or two open cuts. The approximate elevation of the mine is about 9800 ft. above the sea, consequently it is dry and requires no pump. It is accessible to within a short distance by a good wagon road, and an abundance of timber is to be found in the vicinity.

The Last Chance Mining claim was located in 1870, and is situated on the northern slope of Little Cottonwood Canyon, directly opposite the city of Alta. The improvements consist of three shafts—discovery shaft, south west and north east shafts—all having an incline of about 40°. The wall rocks are principally of limestone, and are self-sustaining, very little timbering being necessary. The vein dips almost directly south, averages about 24 ft. in width, and mostly consists of carbonates of lead and oxides carrying silver. The assay value averages \$175 in silver per ton, and 35 per cent. in lead. There are no surface croppings on the top of the ground, except at the discovery shaft, by which the general direction of the vein has been determined. This mine is 1200 ft. long by 100 ft. wide, and has an elevation of about 8800 ft. above sea level. It is near the top of the divide between Big and Little Cottonwood Canyons, and is accessible by road from Salt Lake Valley to Alta, from where there are good trails, and a tramway established for the shipment of ores.

The Hiawatha Mine is situated on the northern slope of Little Cottonwood Canyon, the discovery shaft of which bears south 45° east from the discovery shaft of the Last Chance, 72 ft. distant. The improvements consist of two shafts, a tunnel, and open cuts, all on a level within 50 ft. of the discovery shaft. This claim consists of 2200 by 100 ft., and the mineral vein is very well defined. It averages 24 ft. in width, and consists of deposits of rich carbonate ores carrying silver. The country rock is limestone, and but very little timber is needed for the support of the walls. The average assay of the ore is about \$160 in silver per ton, and 40 per cent. in lead. These last two mines, together with the Montezuma and Savage lodes, constitute what is called the Winsor Utah Silver Mines, a consolidation owned by New York and Michigan capitalists. The property is continually being worked, and so far has yielded very profitable returns. The buildings, consisting of a boarding house, ore houses, &c., are fine and commodious, and the company have made every provision for working their mines to advantage at all seasons of the year. Considering the amount of outlay, this property will compare favourably with any in the district.

B. A. M. FROST, U. S. Surveyor.

Salt Lake City, Utah, August 25.

[To be continued.]

THE MINING DISTRICTS OF UTAH AND COLORADO.

SIR,—Having travelled for many months through the mining district of Utah and Nevada, and having inspected many of the English companies' mines, I will state a few facts in answer to your numerous correspondents who attribute to American dishonesty the many unfortunate investments they have made, and the serious losses sustained in their mining operations in America. The non-success of, and the losses sustained by, the English investing public are more often due to either:—1. The glowing but false reports of English experts sent out from England by English promoters of companies. —2. To the excessive greed of the promoters, who often place the mine on the market at ten to twelve times the amount the mine was bought for from the original vendor.—3. From mismanagement. Generally the extraordinary fluctuations in the value of the mine and the shares are due to the mode of working such mine. Gouging out without doing any work of exploration in the mine being the rule. The results of such a mode of working are periods of great richness and periods of great poverty. Especially is work of exploration necessary on veins, strata, deposits, or beds of ore in limestone formation, as it is well known that in such a formation veins or deposits of ore are subject to sudden changes, at times showing immense chambers of ore, then for a time pinched up to a mere joint, scarcely discernible. Yet, as long as the same limestone stratum continues in depth and length, there is hope by sinking and driving of meeting with other pipes, chutes, or deposits of ore; therefore, it is folly for the investing public to be panic-stricken whenever a vein or strata deposit of ore has suddenly contracted to a mere joint.

With veins in deposits in granite, slate, quartzite, &c., the same changes are noticed, but these other formations are not so prolific of deposits as the limestone. I have observed in my travels that Englishmen in their investments are partial to deposits, Californians to true fissure veins. The consequence is the mines of English companies have a brilliant but very brief life; whereas those of the Californians are slower, more regular, and lasting—with time and development they generally become much richer. These veins rarely carry their wealth on or near the surface, often not before a depth of from 80 to 250 ft. is attained. It is true there are non-metalliciferous veins in this country as well as metalliciferous; the practical miner will generally be able to decide from the character of the gangue, be it quartz, lime, spar, or baryta, whether it is congenial to ore bearing or not. It may be said that few of the mines owned by Californians pay regular profits; this is due, however, as is well known at the mines, to the system of gambling adopted with mine shares in this country. A certain ring purchase the majority of the shares in a mine, get control, force up shares by paying dividends, or down by burying the ore and bringing up to surface waste rock. These rings are continually changing. So it will be seen the merits or demerits of a mine have little to do with the quota price of its stock. Still, no mines in the world are paying such immense dividends as the Belcher and the Crown Point, each on the Comstock lode; also the Raymond and Ely, and Meadow Valley, in Pioche, and many other instances I might give. With strata deposits of ore, between the same strata of limestone, a succession of ore deposits are often met with. Richmond, Emma, the Eberhardt and Aurora are instances of this.

Unfortunately at the Emma, Camp Floyd, Tecoma, Saturn, and Mountain Queen Mines, both the quantity and quality of the ores in reserve have been greatly over-estimated, to such an extent that any miner seeing these mines must come to the conclusion that the Inspectors sent out had for a purpose over-estimated amounts. Let the public compare the reports of the experts, upon whose judgment the promoters bought the above-mentioned mines, with the results achieved after many months' working, and they, the public, cannot fail to see how visionary the estimates and statements of these experts were. Where the reserves in some of the above mines were estimated at so many thousand tons of ore, assaying in the hundreds of ounces in silver, results of many months' working have proved that there was not as many hundred tons in sight as the expert had estimated there were thousands, and that the ore, instead of yielding an average of \$183 per ton in silver and gold, only yields an average of about \$29 per ton.

How many of Prof. Silliman's statements in his report of the Emma, or of Mr. Maxwell, in his report of Tecoma, or of Messrs. Sewell and Nancarrow in their reports of the Utah and Camp Floyd Mines, how many of these gentlemen's statements have been verified by actual result of working the mines? As the shortest time any one of these mines have been now working is seven months, and the longest is two years, it cannot be said too short a time has elapsed to work out the reserves estimated, seeing that in every instance the extent of ground opened out from whence the reserves were estimated was very limited. The Tecoma, with reserves of ore estimated at over 3000 tons, has after seven months working not been able to supply its own furnaces with more than 275 tons of ore from its own mines. The Tecoma, after running one furnace for ten days, and a second furnace eleven days, shut down for want of ore.

Then as to the mines being placed on the market with too large a capital. If the promoters in England would only be satisfied with 100 to 200 per cent. more than they buy the mines for from the original vendors, the public would not have so much cause to complain, and the mines of Utah and Nevada would not be at such a discount in England. The non-success of the Emma is due mainly to being placed on the market with too large a capital stock; secondly, to the costly and inefficient manner in which the mine has been worked and timbered in the past; thirdly, to the gouging out the deposits of ore,

and not doing any work of exploration. It takes time to remedy these evils; I believe they are being remedied, and I believe that ere long the mines will be in better form, and that the star of Emma will again be in the ascendant. A more powerful engine and pump is needed to unwater this mine, or else a tunnel to tap the ore body at a lower depth than the present workings. It is a notorious fact that George Hurst, the well-known mining expert on the Pacific Coast, refused to give \$20,000,000 for the Tecoma mines: these mines the English company placed on the market at 300,000,000 capital stock. The Flagstaff, Devonport, Winnamuck, Richmond, and, no doubt, the Emma, are all good properties; yet there are rumours afloat that the first-mentioned mine has a very costly management, owing to the great number of the officials kept, and that its debts are not paid up as promptly as they ought to be for so rich and great a mine. Of the Devonport it is generally thought by the owners of Devonport stock there, that Mr. Phillips, the manager, is playing a freezing-out game. This Mr. Phillips is well known in London as the late manager of the Eberhardt and Aurora Mines.

The Last Chance Mine keeps up its reputation by smelting Flagstaff ores to a large extent with its own.

The Utah Mine (Bingham) has three immense lodes on surface of low-grade galena ore; the ore carries much iron pyrites and quartz finely disseminated through it. The galena, iron pyrites, and quartz intermixed in minute crystals through the solid mass necessitate the ore being crushed very fine previous to concentration by dressing, in order to separate the iron pyrites and quartz from the galena. In such a state of division I think the round buddle more adapted to the work than the plunger-jiggers now used. Now, the ore as it comes out of the mine carries about 38 to 40 per cent. lead and 12 ozs. of silver. In dressing it it is found it takes 1½ ton of such ore to make 1 ton of dressed ore of 55 per cent. lead and 15 ozs. silver; but it would appear that this 1 ton of dressed ore should carry 18 ozs. of silver, evidently the iron pyrites washed away carries the silver lost. The hope is that in this mine in depth the pyrites may disappear, and that the ore will become richer in silver and lead, therefore the proper thing to have done was to have sunk on the Red Warrior lode to a depth of at least 250 ft. before driving on it. This hope is founded from what has occurred with mines similar to this in Colorado. The greatest depth attained on the Utah is a little over 100 ft.; 600 ft. depth might have been attained for a tithe of the money squandered uselessly. The Camp Floyd, Saturn, and Mountain Queen never had any merits from the first. I fear the same is true of Tecoma.

I learn that another Tecoma mining property is being offered on the English market, and from what I learn of the property I advise my countrymen to have nothing to do with it. Most likely, like the Mountain Queen, it will pay a dividend at the very start, but as the mine will not have earned such dividend, so, like the dividend of the Mountain Queen, it will be its first and last. The information I have here given has been given to my friends long ago. I have written this from the wish to benefit my fellow-countrymen, and to show up what I believe to be the main causes of the non-success of English mining companies in Utah. Though the information came too late for many it may deter some of the public from investing in worthless properties. That great dishonesty has been practised by Americans in their dealings with their English cousins I do not deny, but it is not the sole or main cause of the losses sustained by Englishmen in their investments in Utah mines.

Salt Lake City, Aug. 25.

AN ENGLISHMAN.

THE DOUGLAS SILVER MINE, COLORADO.

SIR,—As the traveller approaches Georgetown, through the wide but precipitous dells formed by the Griffith and Douglas Mountains, either of which present mural declivities 2200 feet in height, he views in many places along its rugged sides, from base to summit, numerous little excavations the work of the hardy adventurous miner: some are so far up as to be scarcely visible to the naked eye; these are tunnel openings, or adit levels, from which in some instances silver ores of fabulous value have been extracted—one of them, the Anglo-Saxon, has yielded silver glance worth \$25,000 per ton. The property of which I am now about to make a few notes is low down, probably not exceeding 150 feet above the valley; it is on the west side, about 2½ miles from the town, and contains some interesting and rather peculiar features, which are worthy of notice, but especially to the mineowners of the district. A cross-cut tunnel has been driven in about 400 feet, and is about intersecting the first lode, of which seven or more are said to lie in parallel courses within 1000 feet ahead. These lodes are counters—they have a north-westerly course, while the generality in these mountains run north-easterly, making the difference of strike about 108°. The geological formation is schistose, but having quartzite and conglomeratic granites as the predominating rock; the gneissoid, although interstratified with, and in places interspersed through, the more silicious masses, is not strongly represented, at least on this south-eastern slope of the mountain.

This being the first example of its kind that came under my observation, I made a careful examination of No. 1 lode and its surrounding rocks in immediate proximity, and found the normal bed planes, as well as the cleavage planes, dip into it from the north. The next thing to which I would especially direct attention is that the bed joints on the south form synclinals with those of the north, making the line of the lode an inverted apex, and thus become a receptacle or reservoir for the infiltrating mineralised waters on both sides. Now, the conclusions practical mining engineers would come to on the examination of such a structure would be that if there are no cross lodes, slides, dislocations, or throws in the stratum, to leave or divert the course of the lode, which is evidently a diagonal fissure lode, and it holds down steadily its present inclination, it must become very productive in mineral in depth.

The lode is from 3 to 5 feet wide, dips at an angle of 70° to the north; the matrix is a slightly granular quartz and feldspar, but in some places compact and hard; the leading vein is composed of mineralised argillaceous matter, quite soft, averaging 8 inches thick. The minerals are—silver-lead, zinc-blende, sulphuret of iron, with traces of antimony and colouring of carbonate of copper and manganese of iron; at the surface it carries from ½ to 1½ ton of good ore to the lined fathom of ground. There is somewhere, not far from this lode, a vein of "yellow-green" porphyry. I have found several loose stones of it on the surface, and a few above the ordinary line of the valley drift, and in the detritus of the mountain slope. Now this vein or dyke should be traced up, for if it comes in contact with the lodes they will be very productive in silver at and along the point of junction. This has been invariably the case in all parts of Colorado where I have made geological examinations, and I would direct the attention of miners to this simple fact, that there is something about this igneous compound, either in its lithological constituents or some peculiar possessive power of affinity, electric or otherwise, that almost invariably causes a deposition of the precious metallic minerals in the lodes which lie in the primary rocks. Stanniferous ores appear to be affected in a similar manner; the elvan courses of Cornwall are igneous veins of the porphyry family; the richest tin I ever saw in mass came from granite in close contact with an elvan. The rich tellurium ores from the Red Cloud Mine, in Boulder county here, hold similar geological relations, and the great mines of the Marshall Tunnel Company, in Leavenworth Mountain, will be found to correspond, and I think, with few exceptions, the phenomenon is universal.

The Douglas Mine is operated by a New York company, of whom Mr. Mathias Goetzee, of that city, is its President; they are gentlemen of spirit and enterprise, and I hope will soon be rewarded for their industry, outlay, and patience.

CHAS. S. RICHARDSON,
Mining Engineer.

GAULEY-KANAWHA COAL COMPANY.

SIR,—In last Saturday's Journal there is a letter signed "Caution," in which the writer says that the above company's property is in the oolitic formation, and quotes Lyell and Ansted as to the inferior quality of such coal.

I am authorised by Professor Ansted to say that "Caution" is right in saying that the "oolitic" coal is of inferior quality, but quite wrong in including the coal beds of the Kanawha and its tri-

butaries in that class. The oolitic lies east of the Alleghenies; the coal beds on the west of these mountains, where our property is situated, belong to the true carboniferous coal measure. But that Professor Ansted is on the point of starting for America he would have replied to "Caution" himself.

Queen Victoria-street.

A. STEUART, Secretary.

THE GAULEY-KANAWHA COAL COMPANY.

SIR,—I am most unwilling to trespass further upon your space on this matter, which, so far as shareholders are concerned, is now narrowed down to a question of accessibility. As I should sincerely regret making use of any expression which might do any injustice to others, I have to thank Mr. Steuart for calling my attention to the fact that I am only said to have "spoken of the district." Whilst readily admit the distinction, I may, perhaps, be allowed to explain myself, and has been understood to imply a general concurrence in the statements made in the prospectus. This has led to my receiving from writers on both sides of the Atlantic letters of remonstrance and statements which I must have known to be contrary to fact. See you with my letter of Aug. 21, for the sole purpose of saying that had not been consulted in the matter;—and was not a party to the Prospectus.

However, in justice to the directors, I may say that I am quite sure they have acted in good faith in their statements. Time will show them that they have been misinformed as to the accessibility of the property; but, as Mr. Steuart courageously puts it, it is only the question of making a railway. They have a fine deposit of coal, but I venture to predict that it will not find its way to a market by the navigation of the Gauley.—*New City Club, Sept. 12.* J. BOWEN.

AMERICAN MINING.

SIR,—History, we are told, repeats itself; so does the fluctuation (only with far greater frequency) in price of the useful metals of commerce, notably amongst which may be mentioned those of tin and copper. It will be no sufficient counterpoise to this fact to allege that mines of gold and silver are less permanent and reliable in the general character than are those of the common metals, because such position can be established. The erratic character of some of the limestone formations, and the capriciousness of their products merely applies to such individual formations, and do not extend to mines of gold and silver in most of the other classes of rocks. They can be but little, if any, doubt that foreign mining has been largely prejudiced from time to time by the promoters basing their calculations as to the future from eccentricities of the moment, and which were but superficially outlined. If the same kind of business acumen had been exercised in the selection and purchase of mines in the Western States of America as is usually done in respect of other enterprises, mining in those States would now be as popular as to many individuals it is repulsive; and instead of bewailing their misfortune and losses, those interested would be jubilant in their success at prosperity. The history of mining throughout the world goes to show that no mine, in whatever country or in what manner soever it may have been worked, whether by slave or free labour, was ever worth 1,000,000,000 sterling. Foreign as well as home mines, to become successful and satisfactory investments, must be purchased at reasonable rates, as well as subsequently worked on the soundest principles of economy. That foreign mines, as a rule, are very much richer than those of European countries no one, I think, would take upon himself to dispute; yet it cannot be denied that mines as poor sections of ground misused as those of any European country may be substituted, with certain decorations, for good mines, and such may be regarded and worked for comparatively lengthened periods to the great discredit and loss of mining. The past ought to be a sufficient warning, at least for the present, against headless speculations. Rushing into investments with an impetuosity akin to the wish with which people are excited by the prospect of imminent danger, rush therefrom may be in consonance with the times, but appears to be sully at variance with sound common sense.

On visiting London soon after my return from Nevada, about six months since, and in conversation with a gentleman there respecting a large silver mining property which I owned in Nevada, as was desirous of having it worked on lease, I was somewhat surprised on hearing him remark that "he feared the comparatively small amount of capital required would give it a correspondingly small appearance in the estimation of the investing public, and make it appear as too little a thing to attract any notice in these fast times." I could not but deplore a condition of things which gave rise to such a remark, and deeply regretted that a community which had heretofore maintained a universal reputation for prudence should have even the briefest period be found committed to sensationalism. It was also informed by more than one individual that their decision opinion was that no company could be formed in London to furnish the necessary funds to work a mine on lease, however assured prospects might be. What will the output of your mine be per acre and of what value and at what cost per ton, and what will be the profits? Satisfactory answers will be required to all these questions, and subsequently confirmed by some expert popularly known in London. Would it be out of place to say here that men were reputed expert in this business of mining who know nothing whatever themselves concerning it, and whose sole information was derived from newspapers and books, and the sifting of working miners' reports by others who might be found verdant enough to afford them any information? But it is to be hoped that the past is past and done with, except for reference analogically for future guidance. The best way which can be made of errors which cannot be recalled is to treat them as beacons to guard against their recurrence in future time. The success of mining, like that of every other enterprise, depends as much on the first as on current costs, and upon either or both, upon the gross revenue of its developed resources. However rich mines may be, the pecuniary success of the owners is derived from the proper adaptation of means to an end. The resources of rich mines, like those of individuals, may be frittered away to little or no purpose. It needs only inattention to the avenues through which wealth circulates, and such channels become increasingly wide, until the streams by indefinite expansion become more and more attenuated, until they subside eventually in utter dissipation. To be upon mining as some evidently do, as a speculation akin to gambling may be a very convenient, but I am quite sure an equally improper way of regarding it. There is, however, a feature common to both which has very much to do with their success, and that is experience, and it should never be forgotten that the most specious pretensions of the most plausible theorists can never supersede practical experience. It is a matter of great importance to this country whether the millions sterling are gained or lost by foreign enterprises. It is an immense difference whether money in mining is unsuccessful spent in the country or out of it, as, in the one case, considerable revenue may accrue to the country at large by the development and increase of its material wealth, whilst at the same time considerable losses may be entailed upon industrial adventures. But if English capital is unsuccessfully spent in developing the resources of other countries, whatever the amount may be, it is an entire loss to the country, because no equivalent in material value has been rendered in exchange therefor, and the money thus expended, instead of passing from one person to another in this country, has passed out of the country in business affords the other party an opportunity to concert measures to circumvent them.

So soon as it became known that highly-spirited mines were being relished, and most acceptable to moneyed parties in England, they were immediately taken to prepare and present the article more agreeably to the taste. Exactly what was required was forthwith agreed to, and submitted with great apparent liberality and candour, which, unfortunately, was esteemed as being highly commendable as well of the mines as the parties recommending them. Whenever it becomes known in what direction a person's proclivities tend, business it is generally an easy matter for the opposite parties to secure all the advantages on their side, and mining is no exception.

to other pursuits in this respect, and, therefore, laxity in any of its parts, whether in its practical working or its financial arrangements, can no more fail of being attended by ill consequences than can any other enterprise, many of which do not involve such multitudinous details as mining, every part of which in its healthy and proper working is vital and indispensable to the proper working and full success of the whole.

ROBERT KNAPP.

Liverpool, Sept. 17.

NOVA SCOTIA GOLD FIELDS.

In the Journal of Sept. 6 you allowed me to explain what might have been done in one district alone, that of Sherbrooke, had it been originally under one management, and, as I hold no property there, but only selected it as the one most steadily worked since 1861, then a mere blue-berry barren, I would ask leave to recur to the subject, and point out what yet may be accomplished with the administration under a prudent consolidation scheme, such as recommended by the Mining Journal of Aug. 30.

The most valuable claims in the district ought now to be procured for a gross sum of 50,000*l.*, and although many of them are still being worked, and are provided with separate crushing establishments, there should be a working fund of at least 10,000*l.*, making a total capital of 60,000*l.*

By previously comminuting the quartz in a Blake's crusher, and driving the batteries with automaton feeders, the Palmerston mill, with its 20 water-driven stamps, would pass through 40 tons a-day, or in a year of 300 days (allowance having to be made for stoppages) an aggregate of 12,000 colonial tons. To raise that quantity of ore the labour of 120 miners would be required, each man raising on an average 100 tons per annum.

Of the tailings of 72,000 tons already crushed, it is not assuming too much to say that 200 tons per month could be recovered and concentrated. At the end of the first year the expenditure and receipts would then be nearly as follows:—

EXPENDITURE.

Wages—80 men at 6 <i>s.</i> , 40 at 5 <i>s.</i> , 10 at 4 <i>s.</i> per day, for 312 days, employed in the mine...	£11,232
8 men, recovering and sluicing tailings, average 75 <i>l.</i>	600
4 mill hands, average 90 <i>l.</i>	360 = £12,192
Salaries.—1 captain, 480 <i>l.</i> ; 2 under-captains, 480 <i>l.</i> ; 1 chief amalgamator, 360 <i>l.</i> ; 1 assistant, 240 <i>l.</i>	1,560
Stores at 6 <i>s.</i> per ton (14,400)	4,320
Cartage on 12,000 tons quartz at 1 <i>s.</i> per ton	600
Cartage on 2400 tons tailings at 10 <i>d.</i> per ton	100
Royalty, 2 per cent. on 41,000 <i>l.</i>	820
Management.—London offices and directors ...	£ 2,500
Resident agent	1,000 = 3,500
Contingencies (10 per cent. approximately)	2,308
Interest at 20 per cent. on 60,000 <i>l.</i>	12,000
Reserve fund	2,320
Total	£40,720

RECEIPTS.

By crushing 12,000 tons of quartz, yielding 16 dwts. 4 grs. per ton (the average of nearly 72,000 tons) at 4 <i>l.</i> sterling per ounce	£38,800
By concentration of 2400 tons of tailings, yielding 4 dwts., or 16 <i>s.</i> per ton	1,920
Total	£40,720

With a larger working force and additional stamps still greater profits would arise, but in proof that the above results are quite attainable, and not in the least over estimated, one can refer to the declared statutory returns for the Province for the year 1867, which were 9494 ozs., or 37,856*l.*, as the result of the labour of only 115 men. These facts, one would imagine, require only to be made known through your influential publication in order to secure for Nova Scotia some of the superabundant capital of the empire, which, despite the mistrust awakened by such *fiascos* (a stronger term might be used) as the Mineral Hill and Emma Mines, is always available for legitimate mining enterprise.

ACADIENSIS.

Sept. 17.

COALS—MECHANICAL POWER.

Sm.—The amount of mechanical force now employed in the United Kingdom is something very enormous. A large portion of that force is derived from coals, the price of which has recently doubled, and produced a state of things that is telling in an adverse direction most fearfully on large sections of the industries of the country, besides wringing the labourer in the price of an article which is, as a rule, indispensable to him. The present cost of mechanical power produced from coals being too great for the prosperity, or even the existence, of a large portion of the consumers, the question whether some substitute cannot be found that may be had at a less price forces itself on the mind of the public. The question, then, is—How can this be accomplished?

The manner how it could be done is herein laid down, and the fantastically high price of coals will be effectually remedied after having been the indirect means of laying the foundation of such a sweeping and permanent remedy for the evil as shall be one of the greatest boons to the country. It is by substituting other mechanical power for that produced by coal—from a source familiar to all—the waterfalls of the country. The mechanical power contained in the waterfalls of the United Kingdom is so great as to completely eclipse all the other forces of that nature now in practice within these kingdoms put together, and is, moreover, never-failing.

That this mighty force can be extracted and distributed over the face of the whole country no one having the least knowledge of engineering will, it is presumed, deny. The best mode of doing so is an open question. It is herein submitted, however, that the shape of compressed air is the most convenient and suitable form, taking all considerations into account. Commencing at the foundation of the subject, one of the large waterfalls of the nation is taken, which serves as a sample for all the rest. Along the route of this river it is proposed to erect powerful air compressors, so as to embrace the whole fall, and extract the whole power contained therein, and convey away the compressed air in suitable pipes over the face of the country where required. The size of such pipes to be regulated according to the demand of the respective localities. Smaller pipes to be used to convey the air from the leading ones into the different works, factories, mines, &c., by which means a perfect network of mechanical power, in convenient form, can be made to circulate throughout the length and breadth of the land and every corner in it. The adaptability of compressed air to existing stationary steam-engines in their present form is eminently peculiar, and might be applied to them in their present condition without material alteration, save in the case of condensing engines, which would require to have the condensing gear dispensed with. With regard to locomotive engines, it might be applied to them in their present state; a larger boiler room, however, would answer better. As there is, in respect of the supply of locomotive engines with a sufficient quantity of compressed air to perform their stages and keep time a material difference when compared with those that are stationary, a few remarks explanatory of the manner in which they (locomotive engines) can be fed by the way will show that no mechanical difficulty that cannot be overcome really stands in the way. In the first instance, level lines, and stations near each other, demand no amount of mechanical power to propel the engine from one station to another. Reservoirs of the compressed air being at every station the boiler could be charged with the needful motive-power to take the train to the next station without inconvenience or delay. In the metropolis the system of working the trains by compressed air instead of steam would not only be a source of profit to the railway company, but would be a boon to the passengers in giving the latter pure air instead of hot flames from the engine to breathe. In the second instance, when fast trains and long stages are run, the best plan no doubt is, in addition to the reservoirs at every station, to have the supply pipes between the rails for the whole distance between the stations, so that the engine might take in feed on its journey, and in motion, as well as at the stations, so as to ensure a

full supply of power throughout the journey and the keeping time. Should it be objected that there is difficulty of feeding the engine in motion a good answer is—They feed *now* in motion with water, and why not air?

Relative to the feasibility of distributing and applying the stores of mechanical power contained in the waterfalls of the country in the manner above described, it is submitted as being perfectly practical, and involving no engineering difficulties that cannot easily be overcome. As to the economy effected by using the waste power in our waterfalls when compared with that in connection with the use of coals, the latter can in no way as a motive-power compete with the former in general use. It is contended then—

1. That the collieries can never compete against the waterfalls of the country in point of cost of mechanical power.
2. That no coals whatever need be required in the United Kingdom for the purposes of producing such mechanical power as is now in general use.
3. That motive power can be obtained from the waterfalls of the country and distributed where wanted at far less cost than it can be from coals at their minimum price.
4. That the rejection of coals for the purposes of producing motive power, and the adoption of the power contained in the waterfalls of the country in their stead, would be a great national boon, and a complete cure for the enormously high price of coals.
5. That the carrying out the system herein laid down for applying the dormant motive-power in our rivers and waterfalls, considered in the light of investments, presents one of the widest and best fields for English capital.

GEORGE RICKARD.

Wenford, Bodmin, Sept. 16.

WASTE OF COAL—No. I.

Sm.—“Thoughts are entertained of utilising the annual twenty millions of waste coal.” So runs a passage in Messrs. Kelly and Co.’s report of the 31 inst. Surely when winter is knocking at our doors, with the prospective of coal at 50*s.* a ton, and thousands and thousands of families totally unable to pay for it, thoughts may indeed be entertained of utilising the coal dust, but instead of merely thinking of such a thing we ought to put our shoulders to the wheel and act. Coal mines in this country are worked not for the national good but for the benefit of individuals, and generally with a view to the greatest possible profit in the least possible time. The immediate interest both of the lessor and the lessee, but especially that of the latter, which ceases after a term of years, has too often been at variance with the true interests of the nation. Let the greatest possible profit be aimed at by all means, but at the same time there should be the least possible waste. I need not expatiate on the large quantity of the precious fuel that is wasted in some of our coal fields. I need not tell the reader how much is needlessly reduced to powder in hewing the blocks out, how much is left behind in the pit, or how much is actually burned or otherwise lost at the surface. But apart from all these sources of waste there is one practice more open to severe censure and condemnation, which is that in working the best seams in a coal district sufficient care is not always taken not to injure lower and less valuable seams, although these might, at a future time, afford ample returns to the miner. Few persons are aware of the comparatively small quantity of coal contained even in a thick seam; nay, many persons actually engaged in working coal pits have a very indistinct notion of the real amount of fuel that is squandered downright. What proportion of the seams is ultimately left unworked in the mines? What proportion of the output of that which is worked is left behind as “small”?

How much of that which is brought to bank is cleared by screenings? How much of the screenings is sold or used, and for what purposes? Forms containing these and scores of similar questions ought to have been circulated throughout the length and breadth of the country, and the answers obtained, together with the proposals as to the best means of remedying the existing waste of coal, ought to have been published by Mr. Munce’s committee, who, instead of bringing out a useless and out-of-the-way report, would have entitled themselves to the everlasting gratitude of the nation at large had they succeeded in elucidating how to stop up the sources of evil complained of, or how to turn the valuable material now squandered to profitable account.

In the Newcastle coal district it has been estimated in different reports that “nearly one-fourth of the coals won up the shafts is taken away by screening before they are put on ship-board, by far the greater quantity of which remains in large heaps near the mouth of the pit, and ultimately takes fire spontaneously.” Now, it would be highly instructive to know what is the percentage of waste in the by far more friable material yielded by the Welsh steam coal field. If I remember rightly, the quantity of coal produced from British collieries, and sold last year, amounted to 123,000,000 tons; and, assuming Messrs. Kelly and Co.’s estimate of the waste to be correct, it is clear that 143,000,000 tons must have been extracted from the pits, of which well nigh one-seventh was squandered altogether. How these 20,000,000 tons of waste are to be turned to useful account is a question of the most paramount importance. I beg to inform those English capitalists who now delight in embarking their spare cash in the mines of the “Far West,” or other distant countries, supposed or reported to contain gold or silver ores, that much nearer home—nay, almost at their very doors—there is a mine of wealth, which only requires a comparatively small outlay of money to yield more abundant and substantial returns than any amount of funds sunk in the diggings of Australia. Turning the 20,000,000 tons of coal now wasted to some practical account would not only prove a most profitable business, but at the same time would be highly beneficial to the community at large. I will go a step further, and say that the utilisation of this wasted material is a national necessity.

But how is this object to be achieved? By what means is mere dust to be so agglomerated and agglutinated as to bring it both into a combustible and a portable shape, or, in other words, enable it to be carried from place to place, and be employed as fuel? Is it advisable to use tar for that purpose, and thereby fill our cities with smoke to such an extent as to render the sky invisible, and shut out the rays of the sun from the sight of the inhabitants? or should an admixture of pitch, peat, or other odoriferous materials be resorted to, and by this means a permanent offence to the olfactory nerves of all human beings be created? or could a process for agglomerating coal dust be devised in such a manner as to produce a fuel with the constituents of natural coal ash for its basis? Whatever the process which is to be thought best in the end may be, it is obvious that something must be done towards the utilisation of coal refuse, and that such a waste as is now complained of can be permitted no longer. In this respect nature itself teaches us what to do. In whatever direction we may look, whatever department of the economy of nature we may examine and investigate, we shall ever find that it, at any rate, does not permit any waste. Both in the organic and the inorganic world the mutual relations of living and dead matter, and the changes undergone by the various substances in all stages, we are ever taught that one lesson, with axiomatic force, which is contained in the words *waste not*.

In the organic world we can discern no waste of animal or vegetable matter, either living or dead. All plants, almost down to their very smallest particles, are used as food by various creatures whose respective organisms they are liable to assimilate. Insects live upon plants; one preys upon another, the bird upon both, and so on. In the inorganic, or, so to speak, more correctly, the inanimate world, too, no waste occurs. Coal, wood, peat, all these substances change and disappear when they are burned or otherwise decomposed, but the matter of which they are composed only puts on new forms. Therefore, if nature itself can stand no waste, how can we? The question carries its own answer. A great effort must be made, and the sooner this is done the better it will be for us all.

Amongst the many proposals that have been made for the utilisation of coal dust, one broad fact has been altogether overlooked, and this is that nature itself throws out a valuable hint which we may learn to appreciate by study—the composition of coal ash. Why not follow the course thus pointed out to us? Study how wood is formed, how it has been changed into coal, under what circumstances this has been done, and so on.

To use tar, peat, pitch, or any other similar materials in combination with coal refuse has been one of the first thoughts of inventors, and patented over and over again for some 100 years, but what has been the result? Hard blocks are certainly made with admixtures of this kind, but manifold are the objections that may be raised against such description of fuel. Apart from what I may venture to call its smoky and sticky nature, it labours under the following paramount disadvantages:—

- 1.—The agglomerating medium burns faster than the coal, which forms the basis of the fuel, and, consequently, the fuel is disengaged before being consumed.
- 2.—It cannot bear high temperature without melting into a mass.
- 3.—It is liable to spontaneous combustion.
- 4.—It emits too many inflammable gases when exposed to tropical heat.
- 5.—The calorific power of the coal so agglomerated is diminished.
- 6.—The process as it stands at present is too expensive.

There are too many uses to which may be turned tar or pitch in the manufacture of colour and elsewhere to permit of their being wasted away in the agglomeration of coal dust to the detriment of both. Tar especially has of late become a most useful auxiliary in the production of illuminating gas, and in various other departments of industry, and it will henceforth no longer be possible to use it for merely subsidiary purposes.

On these and other grounds it has become incumbent on us to look out for some chemical process for the agglomeration and agglutination of coal dust, and the requirements to which such a process must answer are laid down in the following programme:—

- 1.—The process should be as inexpensive as possible.
- 2.—It should be calculated to so strongly bind the dust together as to produce a facsimile of natural coals.
- 3.—It ought not to diminish the calorific power of coal dust, but rather to increase it.
- 4.—The product must not be liable to melt away in hot climate or in the furnaces.
- 5.—It should not be injurious to the coal nor to the different materials in contact with which it is to be burned.
- 6.—It should produce no clinkers.

A chemical process answering the whole of the requirements of this programme is now in existence, and in a future letter I purpose to lay a description of it before your readers.

A. VASSARD.

25, Finsbury-place, London, Sept. 17.

UNEQUAL CONSUMPTION OF COAL BY STEAM PUMPING ENGINES.

Sm.—Owing to the recent advance in the price of coals, and the possibility that such advance will to a greater or less extent be maintained, the utmost economy in their use has become a serious necessity, not merely for the individual householder, but for rate-payers in general, who have to supply the money for pumping the public water supply of their respective towns.

One would have thought that at the present moment, when the diffusion of knowledge and keenness of competition exist to a greater degree than they ever did before, the quantity of coal consumed in pumping a given quantity of water a given height would have approximated more nearly than the following table (which was laid before our Local Board of Health, at a meeting held a few days ago) would seem to indicate.

Can it be possible that in different towns of this kingdom the quantity of coal actually consumed in doing precisely the same amount of work (i.e., raising 1,000,000 gallons of water 100 feet) can vary from a minimum of 17 cwt. to a maximum of 114 cwt.? The difference is due partly to the varying qualities of the coal, but chiefly, I apprehend, to the construction of the engines employed. If so, what are the public sanitary authorities about, and where are our engineers?

WATERWORKS STATISTICS—March, 1866.

Place.	Coals consumed in raising 1,000,000 gallons of water 100 feet.
Croydon	17 cwt.
Hull	15 <i>½</i> “
Southampton	22 <i>½</i> “
Lincoln	25 “
Salisbury	27 “
Lyme Regis	23 “
Sheerness	32 “
Wolverhampton	33 <i>½</i> “
Barnby	33 <i>½</i> “
Manchester	36 <i>½</i> “
Eastbourne	40 “
Margate	42 <i>½</i> “
Walsley	57 <i>½</i> “
Cambridge	60 “
Ely	71 <i>½</i> “
Enfield	93 “
Rugby	114 “

WM. MARSHALL,

Clerk to the Ely Local Board of Health.

THE EXTRAVAGANTLY HIGH PRICE OF COAL IN GREAT BRITAIN—AND WASTED COAL. HOW TO LOWER PRICE, AND PREVENT THE WASTE?

Sm.—Having devoted a large portion of time, and incurred considerable expenses, during the past 20 years, on the subject of fuel consumption generally, and in researches to find a substitute or auxiliary for coals especially, I trust I may be entitled to some degree of consideration for the ideas which have been engendered or created in the long and patient investigation of peat, of various classes or natures, varying in different localities, and according to relative depths or thicknesses of the peat bogs of Great Britain and Ireland. That certain qualities of peat will, in the course of ages, produce ordinary coal—as they have done in long time past, and in unrecorded ages—I consider is a great fact, however it may be denied or contradicted by other practical men. My main object has been to obtain from selected peat of good quality, by mechanical and chemical means and appliances, and in a short time, such a fuel as shall equal, if not excel, coal in a comparative time of burning and use, allowing equal weights of each, ton for ton. To obtain these results and decisions, which I have secured to some extent, has been an arduous labour, and I have carefully watched and studied the similar labours and researches of others, some of whom have spent a whole life and large fortunes in endeavouring to solve the difficult and intricate problem, how to treat peat so as to produce it in the shape of valuable fuel in large quantities for commercial and general appliances and uses effectively, at the same time economically and remuneratively; for, if these conditions are not secured, the false or wrong treatment of peat is, and ever must be, a waste of material, time, and money to a considerable extent.

I am aware of a deep-rooted prejudice and determination of certain persons that the problem is one which will never be solved, simply because numbers of intelligent and clever men have, during the past century, attempted to solve it, but failed for want of knowledge of the simple but necessary laws of Nature which are required to properly convert peat, with proper machinery and appliances, into good fuel of a fitting and proper form for storage in bunkers, or holds of ships and steamers, and in stores, so as to occupy the least possible space with the largest amount of weight or tonnage, requiring no packing (as blocks or bricks of other artificial fuel now do); and also securing a free circulation of air around the fuel whilst burning in the furnace, or when stowed in the bunkers, requiring no raking or stoking, or opening of fire-doors, and preventing spontaneous or igneous combustion in the holds. The form best adapted I consider, and have proved it to be so, is that of a ball or sphere of about 5 inches in diameter, which can be conveniently handled and rolled into their berths.

The ball peat fuel, as prepared by my system, is of considerable density, exceeding the heaviest blocks of coal in specific gravity, and stowing in one-seventh less space or tonnage room than coals require when close packed in natural or artificial square blocks. It is perfectly clean, free from dust, smut, or smoke in burning, is devoid of sulphur, will not clinker the bars, or plates, or tubes, and the ash residue is small but valuable, as it contains a quantity of potash. Add to these great advantages that of its greater endur-

of first-class make was supplied to them, in place of the little boiler first sent out; that it was erected by their own men, and was entirely according to their own taste and fancy. And we now find them, with the boiler of their own choice, and erected by themselves, to their own notions and ideas, to evaporate for us 450 lbs. of water per hour? That is all we want; and if they cannot do that with 50 lbs. of coal, but require four times as much, as stated by Mr. Sturgeon, it is simply unfortunate for them, but is certainly no concern of ours.

PATENT STAMPING MACHINERY AT NEW DOLCOATH.

My attention has been called to two letters in the *Mining Journal* of Sept. 6 from Messrs. Donald, Atkey, and Co., and Mr. John Sturgeon. These gentlemen appear to be very indignant with me for condemning the Patent Stamping Machine which they sent to the mine for trial, and throw out insinuations which are evidently intended to be damaging. I, however, treat them with contempt. Their remarks are to the effect that the quantity of tin contained in the tinstone stamped at the last-named mine is, however, less than that at this mine. But all these matters amount to a complete failure; and it has been most unfortunate for the New Dolcoath Company that it was allowed to be introduced into the mine in order to be tested, as it has prevented the acquisition of efficient stamping machinery when the company was formed, which could have been obtained at a cheap rate, and by means of which we should long ere this have made considerable sales of black tin, and been in a position to make dividends. We have now this machine to do after having unfortunately lost so much time.

With reference to the size of the grates, I may remark that the Patent Stamper has been here so long, and been tried so many times, that I was under the impression the grates first used were of the same gauge as those at South Condurrow. I find, however, that in the gauge has been that of the adjoining mine (Dolcoath), and that the commencement, which is finer than that of South Condurrow, the tinstone stamped at the last-named mine is, however, less than that at this mine. But all these matters amount to a complete failure; and it has been most unfortunate for the New Dolcoath Company that it was allowed to be introduced into the mine in order to be tested, as it has prevented the acquisition of efficient stamping machinery when the company was formed, which could have been obtained at a cheap rate, and by means of which we should long ere this have made considerable sales of black tin, and been in a position to make dividends. We have now this machine to do after having unfortunately lost so much time.

But the strangest part of Messrs. Donald, Atkey, and Co.'s letter is that in which they intimate that in testing the merits of their machine, the fuel question "was never intended to be taken into account." In the name of common sense, then, I would ask what was taken into account? I think if I were the patentee of this machine, and felt convinced that it gave great advantages over the stamps, I should not waste any time in endeavouring to force it upon the company who rejected it, but should endeavour to have a trial given to some other of the numerous tin mines of Cornwall. But instead of this the inventors seem to put their trust in letters to the newspapers. They may depend upon it, however, that if the machine will not recommend itself, no amount of letter writing in the public prints will bring it into use.

W. J. VIVIAN.

New Dolcoath Mine, Sept. 18.

MINING IN IRELAND—GORTMORE LEAD MINE.

Sir,—Will you kindly allow me a small space in your valuable paper for the following few words, as the purport of them tends to the public good of this country?

The Gortmore Lead Mine, on the property of Mr. Edward Guilford, one of our most enterprising Galway merchants, has been worked for the past two years for the sole purpose of testing its value, and to see if it would pay a company to put up extensive machinery, and sink the shaft to a considerable depth, so that the mine might be raised at a much less cost than at present, by working the mine in a miner-like manner. The mine has been proved to the depth of 64 feet, and the lode cut into, which is 4 feet wide, and yields lead, blende, and muddle to the value of 46¢ per 6 feet, or about a fathom of ground. A company will be formed for the working of this rich mine with a capital of 50,000¢, which I say will pay a profit of 25 per cent. to the shareholders after the first year, and for that time 15 per cent. Over 1000¢ per annum has been expended in labour for the past two years. This will give some idea of the amount that would be expended if it were worked extensively by a company, and the good that must consequently accrue therefrom to the public at large. In conclusion, I know of no mine in Ireland or England at the present time equal to the Gortmore Mine at its present depth.

WILLIAM TOM,

Director's Hall, Galway, Sept. 5.

Mining Engineer of 30 years' experience.

"PROGRESS OF MINING ENTERPRISES."

Sir,—Balmynear Tin Mine Company, situate in Wendron, is likely to open out one of the most important and valuable mineral properties in the county. The workings have only attained a depth of 20 fathoms below the surface, where the lode for 40 fathoms in length is 10 fathoms wide, and yields 28 lbs. of tin to the ton of stuff, or equal to 1½ ton of black tin to the fathom of forebreast, the level, its whole width and 1 fathom high, is worth 4000¢ in money value. The shaft 4 fathoms deeper is of a still more cheering character, while a high authority who recently inspected the mine deems it more than probable that the deposit will lengthen as well as grow richer as depth is attained. Hence the next section of the lode to the 30 fm. level from surface will, in all probability, add more than 40,000¢ to the reserves. The present returns are from the backs above the 20; and as the stamping machinery is being extended the returns will soon materially augment. For the latter eight months of 1870 the monthly sales were 143¢ 4s. 9d.; throughout 1871, 359¢ 15s. 1d. monthly; in 1872, 410¢ 17s. monthly; and 1873 up to the end of August month, 467¢ 8s. 1d. Devonshire from time to time has afforded many bright and startling examples of success in copper mining. At Wheal Friendship every 50¢ share returned back in dividends about 2500¢, and for fully half a century it was a source of wealth to shareholders, lords, merchants, and workmen. Then appeared upon the *tapis* the Devon Great Consols, every 1¢ share in which rose to 1050¢ in market value, and in the sequel has returned to the adventurers 1165¢ upon every 1¢ embarked as capital. Again, there has been discovered at Bampfyld immense deposits of copper ore of the richest quality, and at an early stage of its introduction an interim dividend of 20 per cent. has been declared. Another 40 per cent. at least will be paid for the current half-year, and which we are advised might be raised to 60 per cent. could the large banks of iron ore accumulated at the surface be conveyed to market in time, but this is improbable, as the railway to the mines will not be completed before the close of the year. The length of the sett (two miles), the number of copper lodes, varying in produce from 2 to 3 up to 4 or 5 tons of ore to the fathom, the character of the strata, and the facilities with which it can be explored, are all elements in its favour; and, when coupled with the vast deposits of rich iron traversing the whole length of the concession, there is unquestionably a field presented for expansive and profitable mining rarely combined by one company in these days of commercial economy and competition. We heartily congratulate the proprietors on its established products and prospects.

Again, at Llanrwst the Principality is enlivened through the rapidly developed wealth of this mine. The various deposits yield 2, 3, 4, and even 5 tons of lead ore per fathom, and, though the working cost is only 150¢ a month, the ores at surface, the produce of July and August, are estimated at 100 tons, of the value of 1400¢. About 500¢ has been expended in machinery, permanent plant, and buildings, still gains of 300¢ a month remain to sweeten the cup of successful enterprise. There has been no such discovery "if our informant is correct," made in Wales since the Van, about five years ago, the shares in which, 4¢ 5s. paid, rose to 80¢ each, or (say) 1,020,000¢. It is too soon to prognosticate equal success, as years must elapse before the workings can attain the like magnitude, but at the depth now surface the Llanrwst, as reported, surpasses the Van, and we trust that the future of the former will rival the latter in paying 30,000¢ a-year dividends.

It is to such startling prizes as the Bampfyld, Llanrwst, and Balmynear that we must look for encouragement in mining. There

are many young promising undertakings now upon the *tapis*, yet it is with astonishment that we recognise the apathy of the keen-eyed and active members of the Mining Exchange, who are clever in all things save their selection and adoption of mines. What they deal in must be good, they appreciate no merit beyond the magic circle, hence Balmynear in Cornwall, Bampfyld in Devon, with Llanrwst in Carnarvonshire, are scarcely known on the market. It is only when the returns are published, and the actual value forced upon public notice through payment of dividends, that the community at large becomes aware of their existence—hence the initiated usually secure the lion's share.

32, Fleet-street, Sept. 18.

TREDINNICK AND CO.,
Consulting Mining Engineers, and Dealers
in Stocks and Shares.

THE RED RIVER.

Sir,—Since, in my "Cornish Notes," published in the *Mining Journal* of Oct. 12, 1872, I first called attention to the Red River—described its rise and progress, and showed how its banks were fed for the squatters by the particular, and in many ways defective, manner of stamping and dressing tin ore at the mines from which the water flowed into it—scarcely a week has passed without a correspondence upon the subject in different newspapers.

I estimated the loss to the mines at first at 10,000¢ to 20,000¢ a-year, and subsequently, on October 19, corrected it to 40,000¢, the amount since put upon it by Mr. Bolitho. But two of the points I specially referred to seem to have been lost sight of by those discussing the matter and trying to remedy it:—

1.—That by a simple regulation of the stamps and grates more or less tin could be made to flow to the river.

2.—That it was common talk in Cornwall that some of the "squatters" on the river were also agents of mines from which the water and tin flowed. I do not wish to impute anything wrong to these agents, but they have certainly placed themselves in a very anomalous position.—Sept 15.

ARGUS.

THE PROSPECTS OF MINING IN CORNWALL AND DEVON.

Sir,—As an occasional correspondent, I hope I may not be accused of flattery when I say that I have always found your paper open to unbiased and unprejudiced opinions as to the merits and value of the mining properties of Cornwall and Devon, at the same time ever ready to lend assistance in checking and exposing those evils with which innocent speculators are surrounded. My object in troubling you with this letter is to lay before your readers a short list of speculations and investments to which their attention may be honestly called, and as we have, I hope and believe, seen the worst of the depression under which the mining interest have been labouring for a long time, my impression is that much benefit may be derived from a judicious and careful selection out of the many companies brought under the notice of speculators through your and other papers. I may, and doubtless shall, be charged with self-interest in naming some few mines before others, but I do not profess to write about what I do not know. There are many others that I can mention as equally good investments, but I begin at home and leave more able pens than mine to follow up with their own selections. My recommendations are, of course, open to criticism, but I shall reserve the privilege of offering an opinion on the writings of others as they may do mine. I may as well add here that although not a broker, and not likely to derive much benefit for my pains, my business frequently takes me into the mining districts, and having made this branch of industry my study, I am perhaps as well able to offer advice as those gentlemen who have devoted much of their time to feathering their nests at the expense of unfortunate shareholders and speculators.

There is no doubt that mining, when honestly and legitimately carried out, is equal to any other source of investment in which there is risk, more or less. We all very well know that there must be many blanks where there are many prizes, but it will be found that when proper judgment and care has been exercised in the selection of investment that, as a rule, the balance has been on the right side of the book. While there are but few, perhaps, who will substantiate this statement, there are many who have suffered severely for what they call their indiscretion, and consequently condemn mining as a cheat, a delusion, and a snare. Having had some years' experience, I venture to say that had these same persons taken even a particle of care in their choice of investments, and instead of being advised and led by some of the gentlemen devoting to their use the first page of your *Journal*, have expended a couple of guineas or so in obtaining the inspection of the mines brought to their notice by some competent, disinterested, and respectable agent (of which there are some still left), how much money, anxiety, and annoyance they might have saved, and probably all the terrors of the Stannary and Bankruptcy Courts. Could your columns be taken up with instances of fortunes won and lost, and where entire collapse has followed over and injudicious speculation, how many tales might one unfold; but let us hope those time are past, and that the future may be a bright one for those who sink their money in the development of the resources of the two counties, and lend their assistance to the production of those useful metals—tin, copper, and lead. One thing may be said here, and that is, although the period of adversity which we have passed or are passing through have been a hard trial for all, it will have had the effect of weeding out from your list many rubbishy concerns, and will have left for those desirous of genuine speculations a clear and open field for their investments. There may be some few dubious concerns that have tided over the recent panic, but their life is short, and we shall doubtless soon have the gratification of seeing them in the hands of the official liquidator. I fear I have strayed a long way from my early intention, and will now enumerate a few mines that I have given much time and attention to, and that I believe may be safely submitted to your readers as *bona fide*, honestly conducted, and legitimate speculations and investments.

Hingston Down: This mine has recently been incorporated under the Companies Acts, with a liability of 1¢ per share. The prospects of the mine at the present time are such as to induce the belief that but very little, if any, of this capital will be required for a long time to come. The costs are being met by returns, and with a further improvement in the price of copper there is every probability of dividends being resumed. Over 25,000¢ has been returned to the shareholders in dividends since the mine commenced working, and the quantity of ore raised amounts to something over 30,000 tons, producing nearly 140,000¢ in round numbers. In a very old work on Cornwall, speaking of the deposits of ore in the hill on which this mine stands, it says—

"Hingston Down, well wrought,
Is worth London dearly bought,"

and many authorities are of opinion that vast masses of ore have yet to be discovered. The company's affairs are well managed, and have more than once been held up as an example for many mines further west, whose system of keeping accounts is not what it should be.

South Frances was once one of the leading mines in Cornwall, and for many years returned handsome dividends to the adventurers, but recently through the disgraceful proceedings of the late committee certain discoveries were made which almost brought about the entire collapse of the concern. However, the grievance is too well known to require further comment; it is enough to say that the unhappy dispute is settled, and that every endeavour is now being made to place the concern in its old position. The mine is in but 49¢ shares, and prior to the differences just referred to were standing at 70¢ to 80¢ per share. The affairs of the company are now in good hands, and one London gentleman and his friends hold about a fifth or more of the whole concern, with the determination so far as practicable to vigorously develop the property. The flat lode (tin) in West Basset is their great chance of success, but there are other points in the mine which may any day considerably enhance the value of the property. I believe the nominal price of the shares is 7¢ to 8¢, or not more than 4000¢ for the mine. There is a valuable plant upon the sett, and altogether the undertaking is well worthy of the notice of speculators seeking an honest and legitimate source for the disposal of their surplus cash.

South Ward, a silver-lead mine in the neighbourhood of Beeralston, has been at work three or four years, and has recently commenced returns, although of no large amount yet. The depth of the mine is 70 fms., and the lode is exactly of the same description of ground as was found in the Old Tamar and South Tamar Mines, the former of

which gave the lucky adventurers many thousands of pounds in dividends, and the latter 30,000¢, when the mine was inundated by the bed of the river giving way. The mine is being very spiritedly worked, and the general belief is that as soon as the 90 fm. level is reached permanent returns of ore will be made, and the mine placed in a self-supporting position. Two parcels of lead ore have been sold this week, one giving a produce of 68½ ozs. silver to the ton, the other 29 ozs. Shares are principally held in private hands.

Purze Hill Tin Mine, near Horrabridge, is a well-worked and well-managed concern, but having had many difficulties to contend with has been for a time under a cloud. The late water question has been satisfactorily arranged, and returns of tin will now be made, which will more than meet the working cost of the mine. A new issue of shares has been recently decided upon, and are being subscribed for by the present shareholders in a very spirited manner. There is a valuable plant on the sett, and being all water-power the facilities for working the mine, taking into consideration the present price of coal, are incalculable. Shares are nominally 15s. to 1¢, and I should say far below their intrinsic value.

South Carn Brea: This mine commenced operations in 1852, and was always looked upon as one of the best setts in the Redruth district. The affairs of the mine were for some time conducted by the Messrs. Thomas, but many of the shareholders getting tired of paying calls, it was determined to wind-up and dispose of the concern. The present company are developing the mine in a miner-like manner, and the reaching of the ore ground gone through in the 130 to the 150 is a source of anxiety to many. Some few fathoms have to be driven, and there is no reason to believe but what a good discovery will be made.

Bedford United: This mine for many years stood, with its neighbour Devon Great Consols, in the Dividend List, and gave the shareholders the handsome sum of 54,000¢. The lode having failed it was thought advisable to turn attention to a south lode, and operations were commenced a few years ago. A shaft has been sunk to the 115 fm. level, and levels extended in courses of ore varying more or less in value, and ground has been laid open that will eventually prove to the adventurers profitable and remunerative. The low price of copper, and the high price of labour and materials, together with the illiberality of His Grace the Duke of Bedford, have somewhat tended to a limited scale of working for the time being, but as metals are improving and hopes are entertained that His Grace will listen to reason, and remit the heavy royalty under which the company is now smarting, the usual vigorous development of the sett will at once occupy the attention of the shareholders. As a speculation or investment, in my opinion, no mine offers better chances for the disposal of capital; and as half the shares are, I believe, held by the committee and their friends, which is ample proof of their confidence, investors may be certain that their interest would be well looked after. The remaining shares are nearly all in private hands.

Wheal Agar: This sett, situated in one of the best districts in the county of Cornwall, has for some time past been somewhat neglected as a speculation, owing possibly to the dead work and expenditure necessary to be carried out—the erection of a new engine-house for the reception of a large and powerful engine, and cutting down the shaft to a great depth. All this is pretty well completed, and were it not for an unpleasant dispute with a neighbouring mine (who by-the-by are showing that selfish and antagonistic feeling so proverbial in Cornishmen) respecting the keeping the water of the two mines, I should not fear for a considerable enquiry for these shares, as there is no doubt whatever that a good property is in store for the uncomplaining and patient adventurers.

There are many other mines that I could add to this list, amongst them Cook's Kitchen, West Frances, Wheal Russell, Prince of Wales, all well managed and good speculations, but my time and your space for the present prohibits me from lengthening this letter, yet, with your permission, I may shortly trouble you again, and perhaps with regard to other concerns "on the other side of the hedge."

London, Sept. 13.

JUSTITIA.

IMPROVEMENTS IN PUMPS.

Sir,—I have read your correspondent's letter upon the above subject, signed "Progress," with some surprise, and think he has adopted a bad cognomen, inasmuch as he is evidently not aware of what is being done in mine pumping in South Wales. Had he, as I have lately done, walked up the Rhondda Valley, and gone into some of the coal pits, and seen Messrs. Hayward Tyler and Co.'s pumps, some 400 yards down an incline of about 9 in. in the yard, and others situated at the bottom of pits pumping the water vertically, he would scarcely have addressed you in the way he has, especially if he had heard the proprietors speak in the highest terms of them both as regards their efficiency and durability.

Sept. 17.

TOURIST.

OPEN MINE SHAFTS.

Sir,—Your journal and other papers have contained many letters calling attention to the unprotected state of shafts and pits in the several mining districts in Cornwall and Devon. Since I wrote you last on this subject an Act of Parliament has made it compulsory on the lessees of the mines, or the lord of the land, to remedy this evil—this source of danger to man and beast; but the intention of the Act has not yet been carried into effect in all places. When I was at Binner Downs, in Crowan, a few weeks ago, a poor man, who was breaking stones for the highways, said to me, "It is a great shame that so many open shafts should be permitted in this mine: there are 13 of them in this sett to my knowledge, and some of the tops are level with the surface of the ground." I told him that I would represent the matter to the proper authorities, and soon afterwards I read in the newspaper that the lessee of the sett had been called upon to fence the shafts.

There have been many narrow escapes in connection with open shafts. A minister of the Gospel, walking in a dark night through the Chiverton Arms to Chacewater, through Killewerris, alias Carnhot Mine, nearly walked into the old engine-shaft, having a bell-mouth, level with the surface, and close by the road. An impression on his mind induced him to stop; but one step more would have been fatal. This mine is now "sollared." A late clergyman of St. Paul's, Truro, went to Perranporth with his school children to spend the day. Walking on the cliff, where there is a shaft having a small top covered with a bush, he nearly fell in, and if he had done so you may guess the consequences. A gentleman went with his dog and gun in quest of game, when he stepped on a thicket which concealed a shaft. He was there several hours before he extricated himself—the dog howling all the while. He was almost afraid to move. He heard stones which one of his feet detached from the side fall into the water a good way down. At length by a vigorous effort he got off from his horrible position. A mineagent walking home through an old mine near Goldsithney, many years ago, walked into an open shaft and was drowned. His body was not recovered before the reworking of the mine some years afterwards. He was drunk at the time he fell into the "trap." A miner, walking through Hallamning Mine before the last working, fell into a shaft 30 fms. deep to the adit, but he miraculously escaped. He rose to the surface of the water after the plunge; he thought of the adit, reached out his hands and got into it, and there remained till he was found after a search. A man was drinking in a beer-house near Teague's gate a few years ago, but was, I believe, sober when he left to go home through a dark night. He had to cross a small common where was an open shaft about 13 fms. deep, into which he fell, and was starved to death, or otherwise died. He probably lived several days, for a woman going over the common three days after his disappearance heard a sound, but she did not think (before the man was found) that it proceeded from the shaft.

A drunken man going home from a public-house walked up a burrow, thinking he was going to bed. There he lay down and slept till the morning, when he found himself on the edge of a deep shaft. Even drunkards should be protected by the fencing or covering of shafts. A few years ago two young men agreed to go into an orchard at Camborne to steal apples. They filled their pockets. In coming out of the enclosure over a fence, one of them fell through thickets which hid a shaft about 20 fms. deep. His companion kept silence for several days, when he told what had occurred, and the body was picked up—a corpse, of course. If, instead of fencing

round the shafts they are "sollared," it should be done by stone arches, not covered with wood, especially fir-wood, as has been done in many cases where the covering has given way. R. SYMONS.
Truro, Sept. 13.

RHOSWYDDOL MINE, AND PATENT DRESSING-FLOORS.

SIR,—Being a resident in the district in which the above mine is situated, and also a close observer of everything that appears in your valuable Journal concerning that or any of the neighbouring mines, I have followed the discussion that is now going on concerning the Patent Dressing Machinery they have erected there with some degree of interest. And just to satisfy myself about the real worth of these machines, or vice versa, I paid the mine a visit, when I found everything going on full swing in the commodious building they have there. I was at once struck with amazement at the very small number of hands employed, only one girl attending as much as five jiggers, each jigger having three compartments, which would be equivalent to 15 old fashioned jigs. What a saving I thought to myself, to what I used to see in their old dressing-floors. You, Sir, are very well aware that the classification of stuff has been a matter of study to every thinking mind who has any connection with mining, and that it is a process which has been a great drawback in the speedy dispatch of work by the old system of dressing, but in this important branch of dressing lead ore I find that Mr. Green has brought it to a state of perfection; the way in which the different sized grains of stuff are made to go into their different compartments is indeed wonderfully systematic, and cannot less than prove the greatest boon ever introduced into a dressing-floors, discharging the slimes into a series of self-acting round buddies, leaving the water to flow into the jigs as clear as crystal; and as some of your correspondents have referred (with a fear of malicious intent) to lead going down the river, I thought that I would satisfy myself upon that point also; and as a lover of fair play, I was agreeably surprised to find it as free from that commodity as the well out of which my family get their daily supply of water from. And after turning over the schimpings that are on the bank there, the only conclusion I could reasonably come to was that if "Pedestrian" were to accept the kind offer of Mr. Dunn to give him full and free liberty to go and set up his stand on the river side along with his idolised toys—the line and gear-fish—I do not think he would be able at the end of the quarter to sample my stuff-box full of clean lead, let him be ever so clever as a dresser. Again, as regards the machinery going out of repair, I can see no reason why they should go, if they are put up with the same exactness as has been displayed here—everything works like a watch; they are, undoubtedly, the perfection of mechanism.

"Has 'Pedestrian' and his confederates been to the floors?" was a question that suggested itself to my mind; and the only answer that I could possibly arrive at was No, and that all they have written about them are the fruits of a highly prejudiced mind; unless, indeed, they pedestrianise in their sleep, which I am rather inclined to think they have been doing, and at last put their poor feet in a bee's nest, where I think they are deservedly well stung—not by personal insinuations, but by incontrovertible facts, which, I am happy to add my humble testimony, are fully borne out by the machinery. And to give Mr. Green and the machine the credit they so richly deserve, I would ask all those who have read the effusions of "Pedestrian" and Co. not to form an opinion concerning them, but go, as I have done, and see for themselves, when I feel assured that all unprejudiced minds will leave the floors, as I did, well satisfied with the great efficiency of the machinery, not only as a labour saving, but also as a lead saving system.

Sept. 16.

A LOVER OF FAIR PLAY.

SELF-ACTING DRESSING AND OTHER MACHINERY.

SIR,—"Pedestrian" has still something to say, although very little, and that little mostly wrong. I think it quite consistent to denigrate a person who hesitates to give his name "Nobody," especially when he assumes the position of a public critic. There was no going round the corner, or under the cloak, to abuse "Novie," and I did not assail "Pedestrian." How could I assail "Nobody"? I don't know him, and therefore could not assail him; all he gave me an opportunity to do was to repeat an assault, but he has assumed the position of a public critic, and he has made but little progress; neither has there been a display of ill humour, or any evidence of it, in my effusions. It is very interesting to hear "Pedestrian" give the history of his great doings in connection with the best mines, and dressing of many hundred tons of ore. I am sure your readers will be grateful for the information, and nobody will suppose it is going round the corner in evading a question as to who he is. For myself, how am I to express myself for the twice repeated warning to be more circumspect in future I cannot tell. I have been thinking, and others also, that the caution might, if needed, be of use to "Pedestrian." Then, again, how profound the remark that the simple denial of statements made will not make them into falsehoods. Let me add that the simple publication of the names of the mines will not make it true, however often it may be repeated; and I have also to say that when he talks so much about German jiggers, that he does not know my system of dressing ores, and it has not entered into his dreams or thoughts even yet, and he has furnished so little of fact, that he is quite in error in supposing that such as he has supplied has caused me the last chagrin, as quite the reverse is the fact. Mr. Editor, I see he has applied to you for your testimony of previous good character, which I dare say is all right, but as you know very little about me I don't know how you are to compare; he perhaps he wishes your help in the dilemma he has placed himself in, for he seems utterly unable to extricate himself. Can you show him how a mine having made no profit can be a rich mine? How a mine is getting sadly into the shade when, from a large monthly drain of capital, it has just begun to pay its way? And how plant and machinery which is saving a very large amount of labour cost can possibly effect the result which he attaches to it? I am much indebted to him for figures of speech, which, by constant reference, enables me to express myself; and I see he will go round or into any corner rather than establish his original sayings, but until he does this very much importance will not be attached to anything he may have to say on other subjects in future, whatever may have been in the past.

I have told "Pedestrian" where he can ascertain the difference in the cost of dressing between my system and the best in use two years ago. Let him write to the parties himself, and publish the replies; the parties are equally as experienced as himself, and as respectable, too. This will be far better than me writing, as I see I shall have to bring our books to your office before I can establish anything, as while he wants people to take his assertion unsupported for an established fact, he requires a tremendous amount of evidence with my assertions. I am glad to find that "Pedestrian" is a man of means, and is able to go to Rhoswyddol and spend a day or two, and make himself fully acquainted with the system, and instead of a superstitious guide get a thoroughly practical man to explain everything. If he will let me know of his visit I will see that such a one is at hand. After this is done, I venture to say, that if his prejudices are not too deeply rooted, he will at least find something to admire as well as condemn, and that which he now fancies elaborate and complicated he will discover is simplicity and efficiency. Perhaps, after all this, I am too sanguine in expecting an order, but who knows? If not, however, there is no lack of orders, and I think I am indebted to "Pedestrian" for some of them. As regards venturing the subject, I shall not do it by giving my own certificate, but I quite agree with "Pedestrian" that a comparative table, showing the cost of dressing ores with my system and the system adopted at some of the best mines up to the beginning of the year 1872, will be of use. This can be had from where both systems have been used, and I will take care this is done at an early day. I, however, thought the certificates published were sufficient, the table probably may be better. One thing is quite clear, that with the present excessive rate of labour, and the comparative low prices of ore, attention to labour-saving machinery in all the departments of a mine will force itself upon all concerned therein, and the very existence of a great number of mines is even now dependent on what can be done in this way. The numerous applications I have in ample evidence, quite independently of my own experience. Possibly I may have more to say on this supremely important subject at some future time.

Aberystwith, Sept. 17.

GEORGE GREEN.

GREAT WHEAL VOR, AND ITS MANAGEMENT.

SIR,—I observe in the Supplement to the Journal of Sept. 13 that at the general meeting of the Great Wheal Vor United Mining Company the Chairman stated that the working of the slimes was let to Capt. Oid on tribute at 5s. in 11. It is generally believed that Capt. Oid has realised a large sum of money already in this undertaking. Query—why should he be let to others to make such handsome profits when the adventurers are in a much better position to work it themselves? The Red River had, but this surely is worse.

Breage, Sept. 16.

EAST WHEAL LOVELL MINE.

SIR,—The remarks made by "A London Shareholder" in last week's Journal so exactly coincide with my own ideas that I feel constrained to seek for information on the same subject through the medium of the Journal. The accounts seem to me to be most meagre, and I cannot help thinking that the mine is not worked out for the best possible advantage of the shareholders. Living so far from Cornwall I am unable to attend the meetings; but I consider it to be the duty of the Chairman to furnish us with a more intelligible balance-sheet. I have often seriously thought of going to the expense of sending my solicitor down to the meetings in order thoroughly to sift the accounts. I have no interest whatever in disparaging the mine for speculative purposes, as I hold a considerable share in the property; but I write these few lines in the hope that the managers will look a little better after the interests of the shareholders. By kindly inserting this in your next impression you will confer a great favour upon—

ONE IN THE DARK.

CARDIGANSHIRE MINES—TYLLWYD MINE.

SIR,—Allow me to correct a number of mis-statements and errors relative to the Cardiganshire Mines, contained in a private Circular, and copied into the Supplement of last week's Journal. The Circular states that Caernarvon, the next mine to Tyllwyd, is being worked at a profit, whereas it is being worked at a loss; it represents Cwm Erida as returning large profits, whereas it has ceased working for several months, and has yielded no profits for a long period; it represents East Darnen as paying 5000l. a year, whereas a third of that sum would be nearer the mark; it states that Cwmystwith is paying 5000l. a year, whereas it is yielding no profit whatever. There are other errors which I will pass over. The writer is not, perhaps, aware that the lodes of Cardiganshire require more expensive dressing machinery than any lead lodes in the kingdom, or he would not mention 7000l. as enough to erect such machinery and open the Tyllwyd Mine on an extensive scale.

CAUTION.

HAREWOOD CONSOLS MINE.

SIR,—This sett is situated in Calstock, and is granted by His Royal Highness the Prince of Wales, at 1-20th dues. The sett is bounded by the River Tamar on the north, and close to the Morwellham Quay, thereby causing a great saving in carriage. It is very extensive, and there are four lodes which pass through the length of the sett. On the western part two lodes were opened, the south one being 8 ft. wide, underlying north, composed of fine gossan, capel, quartz, mottled, and copper ore; the north one is nearly perpendicular, 2 ft. wide, a fine-looking lode, and forms a junction with the south one about 42 fathoms from surface. An engine-shaft was commenced 12 ft. long by 6 ft. wide, and sunk to the depth of 36 fms., leaving about six more to reach the junction of the two lodes, where a good deposit of ore may be expected. The water is strongly charged with copper, and a little to the west of the shaft is the great cross-course, which passes through the Devon Great Consols, and other mines which have produced such large quantities of copper ore. On the eastern part of the sett two other lodes were opened, producing some copper ore, and are of great promise. In the engine-shaft there are 36 fms. of 7-in. lift, the same cased and divided with footway, &c., all complete. At the sur-

face there is a shaft-bob, sweep rod, &c., attached, poppet-heads, pulleys, kibbles, wire-rope, hauling-machine, capstan, and everything complete, without a steam-engine. There is also an engine-house, smith's shop, oil, smiths' and miners' tools, and all other requisites complete. The water is very easy, therefore a small steam-engine would prove the mine.

Morwellham, near Tiverton, Sept. 17.

THOMAS NEILL.

THE FLAGSTAFF MINE, AND ITS MANAGEMENT.

SIR,—The statement in the Journal of the weekly product of the Flagstaff Mine and the remarks appended to it last week are calculated, I think, to lead the shareholders to indulge hopes which are not likely to be realised. I do not wish to take a gloomy view of the ultimate prospects of that mismanaged property; but I cannot see how, under the most favourable circumstances, the financial position of the company will admit of a dividend for many months (say, twelve) to come. Look at what I conceive to be the facts of the case. For the first five months of the year communication was practically cut off between the mine and the furnaces, most of the charcoal stored at the latter was spoiled by the snow, and the bullion turned out hardly sufficient to pay the miners' wages. The monthly dividends had to be provided for all this time, and the only way the money could be raised was by bills for the sale of the ore at a price far below the value of the ore, which was to be delivered to the buyer when the roads were open; these bills had to be discounted at a further loss, and to this must be added the banker's commission for cabling the remittance. What wonder, then, that the company was insolvent at the end of May to the amount of 30,000l. I confess I am surprised that the alleged debt was not double or treble the amount; nor am I certain when the accounts are before us whether they will not reveal this as the true state of things.

Now we are told that the product of last week is 63000. What does this mean? Not that the company have "turned over" that amount of cash, but that an amount of ore has been hauled up of the estimated value of 63000. Of this ore we may suppose one-third goes to the parties who contracted for its purchase in the spring, and for which the company received anticipatory payment. Suppose another third is melted, and the former is stored for winter use; the former will just pay the current expenses of the mine, and the latter will be added to the stock which is to keep the furnaces going through the winter. Snow begins to fall in Little Cotton wood early in November, and if we assume that hauling can be carried on till the middle of that month the stock of ore by that time will not be sufficient to work the furnaces with remuneration to the company. If, then, by the time the roads are again open the company is out of debt this is, I think, as much as we can hope for. In the course of the summer months the profit out to be sufficient to pay the shareholders a dividend in the autumn of (say) 11s. a share, and I believe that this annual dividend will be as much as the shareholders will ever get.

Of course, I assume that henceforth the mine will be worked judiciously and economically; there can be no doubt that all this time its capacities are being unduly forced that its financial position may be recovered. A few more repetitions of the policy of this spring would soon prove fatal to the undertaking. I believe the directors are beginning to wake up to a sense of their position. I am glad to think, for they have certainly much to answer for; unquestionably, they were morally, if not legally, bound to give timely notice to the shareholders of the financial state of affairs in June, and the consequent necessity for the suspension of dividends. They kept the fact quiet, and the result has been one of the most cruel instances of the depreciation of a good property which has been witnessed for many years. When the directors issued the warrant for the best interests of the shareholders, and to inspire confidence among the public? I think not; and were I not thoroughly well assured from sources independent of the board that the mine is good, and with good management will prove productive for many years to come, I should long ago ceased to be—

A STOCKHOLDER.

THE TECOMA MINE.

SIR,—It appears that the board of this company is puzzled at the reticence of their manager, and is beginning to lose confidence in him because he keeps them in the dark. I was not aware that there was a resident manager at Tecoma Mine, I thought that the mine was in the charge of Mr. Maxwell, who may be a very competent manager for I know him, but like other men, he has his faults. The board imagines that it is as easy for him to pass from Flagstaff Furnaces to Tecoma as it is for the directors to walk from one office to the other in Great Winchester-street. What would be thought of two mining companies, one in Cornwall and the other in Wales, who agreed to work their respective properties under a joint management? Yet this is what is now being attempted by the Flagstaff and Tecoma boards, and we see the result. Thousands of dollars are being wasted, and a valuable property frittered away. Let the Tecoma directors renounce this penny wise and pound foolish system. Let them select their own manager, take care that he is honest, prudent, and energetic, give him a liberal salary, and tell him to "stick to his last," and I have little doubt but that in a little while his property will be appreciated at its right value, and will be returning handsome profits to the shareholders.

[For remainder of Original Correspondence, see to-day's Journal.]

THE MAMMOTH COPPERPOLIS OF UTAH.

THE NEW MILL.

Roseville is situated among the foot hills of the range of mountains extending through the entire length of Tintic district, on the east side of the valley, at their southern terminus, and about nine miles from the Mammoth Copperopolis Mine, seven miles from Silver City, five miles south-east from Diamond, two and a half miles from the Shoshone Reduction Works, to about the same distance from the Tintic Mill and Mining Company's Mill. From the mine the road follows down the valley nearly six miles. The balance of the way it is slightly up grade. We started from Diamond and skirted the hills, enjoyed the really fine scenery, and reached the mill at 11 o'clock. The Mammoth Copperopolis Mill, in connection with the mine, belongs to the Mammoth Copperopolis Company—a corporation organised in London—and is controlled by a board of managers residing there. We were most fortunate to meet, on our arrival, Mr. E. Bishop, one of the above named directors, with whom we enjoyed a very pleasant and profitable chat. Mr. S. W. Valentine is the resident managing director, and Mr. S. E. Greeley superintendent. The main building is constructed of wood, upon a fine hill side. Its foundations are stone, all of which is a solid and fine appearance. The mill has 15 stamps of 750 lbs. each, in three batteries of five stamps each. The framework within which the stamps stand is large and finely constructed. There are six amalgamating pans, three settlers, and one agitator. A small car carries the pulp from the battery to the pans. On the south-east side of the mill is situated the retort and smelting room, although not large, still sufficient, no doubt. The pans are driven by direct connection with the engine, the line shaft passing across the whole mill. The engine is situated on the south-west side of the mill, is a large, strong frame structure, resting on a very solid foundation, is of 25 horse power, 30 in. stroke, with variable cut off. They have two 54 in. boilers, 14 ft. long, incased in fine walls. Although the general arrangements seem complete, and while displaying no lavish outlay, are pleasant, substantial, and conveniently arranged. The work of construction was commenced about June 1, and is now completed, entitling the architect, Mr. C. C. Perkins, and Mr. Sheldon B. Davis, builder, to much praise, for surely the entire structure is creditable, and we are glad its owners are proud of it.

Mr. Greeley informed us that they were experiencing the greatest difficulty in procuring quicksilver, owing to which they would be unable to amalgamate for some days. Mr. Bishop informed us that he had recently returned from California, where he had passed a month in endeavours to make permanent arrangements for this indispensable article. The ore falls from the dump upon an iron-covered dry kiln; after being crushed in the breaker it passes into the battery, &c. They have some 200 tons now at the mill, and are receiving from the mine from 30 to 35 tons per day. The mill has a capacity of 22½ tons each day—24 hours.

There are now employed about 20 men. Judging from the appearance of the ore we believe they will produce a quantity of bullion that will add to the present value of the company's stock, and gratify its owners. It seems to us, away down here, that it would be fine idea or the other directors to come over the Atlantic Ocean who fill responsible places with and for them. No doubt it would have a happy influence on all parties.

In connection with the mill this company are erecting a copper smelter, under the direction of Mr. John Williams. This is a frame building, 45 ft. by 30 ft., with 16 ft. posts. This furnace is unfinished, but will contain two stacks made of iron, with boiler-plate water-jackets. The lining will be of Utah fire-brick. Each of these furnaces will have a capacity of 12 tons every 24 hours. The motive-power is derived from the mill, which is situated 80 ft. distant. The water used in this furnace goes into a large tank at the mill, thence into the pans. Water is supplied in springs over two miles away, conducted in galvanised iron pipes. We made enquiry as to the quantity of water, and was informed that they had enough and to spare.

We wish to express our thanks to the gentlemen who added so much to the pleasure and interest of our visit at the mill, giving us information and extending to us every courtesy. May success reward their efforts.—W. R. B. (Diamond, Aug. 22).—Salt Lake Herald, Aug. 27.

UTAH SILVER-LEAD COMPANY (Bingham).—Mr. John Longmaid,

the new superintendent of the Utah Silver Lead Mining Company's property, Bingham, has taken hold of his work there with energy and aim, and is so satisfied with the indications, the prospects, and the country that he has resolved to permanently remain. Yesterday, with proper sponsors, he filed his declaration to become a citizen of this great and glorious country, and expects henceforth to look upon the Stars and Stripes as the proud standard of his future home—his adopted home. Long may he wave!—Salt Lake Herald, Aug. 20.

THE UTAH SILVER-LEAD COMPANY.—Referring to the meeting of the shareholders held in London on July 25, the Salt Lake Journal thinks the company is destined to be a permanent paying concern. The new superintendent, Mr. Longmaid, who lately arrived from London, is a mining engineer of many years' practical experience. He has expressed himself in the very highest terms about the great value of this mine, and the immense quantities of ore in sight. As regards the concentration of second-class ores he has proved this to be a complete success—raising the ore from 35 to 75 per cent. in lead, and from 17 to 30 ounces in silver. As soon as the rest of the concentrating machinery arrives from England he is confident he can save more silver and raise the percentage to 25 ounces. We are fully cognisant how our old friend and correspondent, Mr. Henry Sewell, has fought this battle against all comers. He also holds 6000 worth of stock in the new company, which he invested to prove his faith tangibly in the mines of the company, notwithstanding the bad management. This is one of the many proofs how ignorant and reckless management will cause a collapse in the best mining property.

LONDON GENERAL OMNIBUS COMPANY.—Traffic receipts for the week ending Sept. 14, 1873, 18s. 5d.

BRAIN'S NEW SYSTEM OF MINING BY MEANS OF BORING MACHINERY, DYNAMITE, AND ELECTRICAL BLASTING.

The branches of mining to which I shall refer in this paper are named of which I shall chiefly confine myself.

Shaft-sinking in hard rock may be divided into five processes—1. Filling up the water met with in the strata.—2. Boring the holes for the powder.—3. Charging the bore-holes.—4. Exploding the charge.—5. Clearing up the rubbish or broken rock. With the first and fifth of these processes I have little to do in this paper, as the labour is nearly the same under this as under the old system. Nor shall I introduce to notice tubbing, steining, or walling, as they do not immediately belong to the subject in hand. What now remains to be treated of are boring the bore-holes, charging them with powder, and exploding the charge.

Under the system commonly employed bore-holes are bored by hand-labour, charged with blasting-powder, and exploded with safety fuse. Under Brain's system bore-holes are bored by a boring-machine, charged with an explosive which explodes as well under water as in dry place, and the holes do not require tamping or drying. Charges are exploded by electricity. I will now show a comparative statement of the cost per yard for sinking in our shafts for one fortnight under both systems, and will afterwards explain the method adopted at this mine to carry out the new system, and will then incidentally mention some of the difficulties encountered in its introduction. It is necessary to state that our shaft is being sunk through the mountain limestone, a hard rock, and that with both systems I include labour for filling up 20 to 30 gallons of water per minute, this being about the quantity one man has to fill in the bottom of the shaft.

Under the old system we put five men in the bottom—four borers and one water-filler. The four borers bore and blast in the eight hours two sets and a half of holes—i.e., five holes of an average depth of 2 ft. These men would also clear up all the broken rock blasted. This will be for the three turns 30 ft. of hole-boring. The broken stuff is cleared up as we go. Under the new system we put three men in the bottom in each turn—viz., one leading man to work the boring-machine, one ordinary labourer to attend to the leading man, and one to fill up the water. These men bore with our machine in one eight-hour turn twelve holes some 4 ft. and 5 ft. deep, but of an average depth of (say) 3 ft. The second shift or set of three men bore eight holes, making the total distance bored to be 60 ft. The second shift also blasts the whole 20 holes. The third shift fills up all the rubbish, and makes all ready for the first shift to recommence the same course. By the new system the total cost of sinking for one fortnight is as follows:—

Sinkers three, 12 days each, at 5s. 6d.	£10 7 0
Labourers six, 12 days each, at 3s. 6d.	12 0 0
Engine-stokers two, 12 days each, at 2s. 6d.	3 0 0
Dynamite, 80 lbs., at 2s.	0 0 0
Electric fuses (Brain's), 20 per day, at (say) 6d. each	0 0 0
Coal for air-compressing engine, 12 tons small, at 10s.	0 0 0
Oil for engines	0 0 0
Total	£14 7 0
Distance sunk is 5 yards; cost per yard	2 14 0

By the old system the total cost of sinking for one fortnight is as follows:—

Sinkers twelve, 12 days each, at 5s. 6d.	£3 12 0
Water-fillers three, 12 days each, at 3s. 6d.	6 0 0
Blasting powder	1 2 0
Total	£10 0 0
Distance sunk is only 3 yards; cost per yard	15 13 4

The above statements are not what can or may be done, but what has been done, and what we are now doing. They show a difference in favour of the new system of over 6l. per yard in our shaft, without taking into account the difference in the rate of speed of sinking. The new system does not cost any more than the old system for hand-men, winding engines, supervision, or anything that is not included in the foregoing statements. Were these items, together with the interest of the capital invested in the whole undertaking, to be charged on the yard driven, the difference in favour of the new system would, of course, be more apparent. I will now describe briefly the means we adopt to obtain these results. The first thing required is a good boring machine, the second an explosive which will not deteriorate, and the third electric fuses which will explode without a single failure, either singly or several together, simultaneously.

Rock-Boring by Machinery possesses but little advantage over hand-boring for mining purposes, unless there be a method of blasting the bore-holes much deeper and quicker than is commonly done, as nearly all the time gained in boring shallow holes would be lost in adjusting the boring-machine, and removing it to and from the face. Before introducing the system Mr. Brain went to several places in England and Wales to see various machines at work in the mines, to ascertain the miners' practical difficulties, and after carefully examining them, and comparing the merits and demerits of every one he saw, he decided upon choosing the—

Burleigh Rock Drill, as being, from the excellence of its action, its lightness and simplicity of construction, as well as its durability, the one, in his opinion, best adapted to mining. The results prove the accuracy of his judgment, as, although it has been at steady work for nearly 12 months by ordinary miners, we have never had but one breakage, and that a very slight one, almost too insignificant, in fact, to be mentioned. When we first tried the Burleigh Rock Drill we used the tripod stand usually sent out with it for shaft sinking, but this we found to be a clumsy apparatus for the purpose. The tripod may answer in places where the bottom is level or regular, and not much inclined, and where there is plenty of room; but where, as in the bottom of a sinking pit, it is generally uneven and confined, it is a difficult matter to get the legs spread and fixed sufficiently firm to keep the machine steady while at work. Moreover, where the tripod is used it is difficult to fix the legs so as to be able to bore a hole exactly in the place, and also in the direction, in which it ought to be, and especially where this is close to the side of the shaft. With the ordinary stand, as sent out by the makers, it is impossible to put a hole close to the side of a round pit, but the difficulty may be greatly lessened by the use of a longer leg behind, by means of which, and at the same time bringing the front legs of the tripod closer together, it is possible to put in a hole within a very short distance (say, of 2 or 3 inches) of the side, and sometimes nearer than this. To insert the long leg behind, however, and alter the distance between the legs, although simple operations, and easily done, take time; and when to this is added the time of fixing the whole machine, and to that of taking it up and down the shaft, it is difficult to see what advantages the machine possesses over the old method. It must also be borne in mind that with the tripod the legs must be moved for every hole. Besides this, it is necessary to remember that in sinking a shaft in very hard rock we are compelled to bore holes in the side of it, and this, in many cases, after the bottom is taken out for several feet below the projection in or behind which the hole should be bored. In this case the tripod stand is a failure. I knew of no way to put in such a bore-hole before Mr. Brain invented the sinking stretcher, except by hand; and in many instances besides this, in actual practice in sinking, it was found better—that is, quicker and less expensive—to put in some bore-holes by hand. On the whole, therefore, we have found that the Burleigh Rock Drill on the tripod stand does not, for sinking purposes, possess but few advantages over the old system, for either speed or economy.

The general success of the Burleigh Rock Drill itself for boring after fixing it having been established, and, in truth, being more successful than was anticipated, we afterwards got the stretcher, mentioned above, to try in the shaft instead of the tripod stand. This proved a success. We are now able, by using the stretcher, to put in holes in any direction, and as close to the side as we chose. Not a single bore-hole has been put in by any means except the Burleigh Rock Drill for many months, and the sides of our shaft are smoother, and more truly perpendicular, than is ordinarily obtained by hand labour. It is unnecessary to add anything in favour of the Burleigh Rock Drill for mining purposes, as despite the incubus of the tripod stand, by which, like Simbad's "Old Man of the Sea," it has been and is encumbered, it has hitherto been able to maintain its position as the best Rock-boring machine for hard and steady work.

The stretcher in use is similar to the ordinary one sent out with

the drill for driving headings or tunnelling, lengthened and fitted with lifting clamps, and I believe I am correct in saying that this was never used for shaft sinking by anyone before. At first we made legs to fix underneath the stretcher after the same had been tightened between the sides, but after several trials we did away with these useless and cumbersome appendages, and at present we never use a leg, or anything else, as a prop except in special cases. In a large shaft I would, nevertheless, recommend that a leg be kept in hand, and used if required, as it may be, where the machine is fixed near the middle of the stretcher, as otherwise the machine would vibrate while at work. The method of working the drill on the stretcher is simple. After tightening the stretcher by means of the screw in its end between the sides of the shaft the drill may be turned in any direction by means of the universal joint. To remove the drill we hook one bridle-chain to the top of the machine, and the other bridle-chain to a short chain, attached by means of a clamp to the other end of the stretcher. This short chain is the same length as the other, so that when the rope is tightened the stretcher is suspended and horizontal. While hanging at liberty by the rope it is readily seen how easily the machine may be adjusted to bore in any part of the shaft, and also in any direction. As soon as the spot is decided upon the sinker stamps a place in the side of the shaft for the stretcher-claws, and also in the opposite side for the screw-point; he then signals to the engineer to raise or lower, whichever is required, then secures the whole in its place by tightening the screw of the stretcher, when the bridle-chains are thrown off, and the drill is ready to start. For the convenience of the man who works the machine, we attach to the stretcher a step like an ordinary carriage step, upon which he rests his foot while the machine is at work. By sliding the machine along, and turning it over on the other side of the stretcher, several holes may be bored without moving the stretcher; this is an important advantage, as it saves time. Our drill is worked by compressed air at a pressure of 80 lbs. per square inch, and this air ventilates the shaft after working the hole. After boring a sufficient number of holes, which we do all over the bottom of the shaft or the face of the heading, and with the practice we have had, we are now able to do this without putting in too few or too many holes, we take the machine out, and also all the tools, and prepare for the—

Blasting.—To charge the bore-holes with ordinary blasting-powder in a sinking pit where the bottom is wet is a tedious operation; more especially is this the case where the rock in which the hole is bored "weeps," or leaks, water into the bore-hole. Stemming or drying the holes then becomes necessary, and this is a slow, and often an uncertain, remedy. Water-tight cartridges are recommended by some, and in many cases it is absolutely necessary to use them, as it is next to impossible to keep the powder dry by any other means. The consequent loss of time by stemming, or the shallow holes rendered necessary by the use of cartridges, caused Mr. Brain next to his notice were Horsley's A and B blasting-powders. These blasting-powders we submitted to several carefully arranged experiments to test their utility and strength. This gentleman's powder is a remarkably good blasting-powder, as it is much stronger than ordinary blasting-powder, and it does not require tamping or stemming. Moreover, there is neither smoke nor smell, nor any unpleasant gas left after exploding large quantities of it. It possesses, however, one great defect, which will, I fear, preclude its use for mining purposes, and that is the necessity for its being kept perfectly dry. In this particular it does not differ from ordinary gunpowder, and, like this, for use in a damp place it must be enclosed in a water-tight cartridge, which detracts considerably from its strength in hard rock if it does not fit the hole exactly. In addition to this it is liable to explode by friction if it fit very tightly. The cartridge must not be so tight in the hole as with ordinary gunpowder, but must be sufficiently slack to slip in freely. The best blasting-powder that we have been able to obtain for our purpose is—

Dynamite.—With this all that is necessary is to push it in the hole, without either stemming the hole or tamping the powder, and drop upon it the fuse by the wires which we connect to the cable that is suspended down the pit, and all is then ready for exploding. It may not be amiss to mention here that by the use of dynamite the whole system of boring holes is changed. Instead of these being, as with ordinary blasting-powder, of a depth of 30 in., 2 ft., and often 16 in., or 14 in., we are now able to bore from 3 ft. to 4 ft. regularly, and dynamite brings it out to its full depth. While considering the comparatively shallow holes named here for old powder, it must be remembered that ours is a very confined place to use it. It is necessary for a beginner to note carefully the effects of blasting with dynamite, so as to learn in what position and manner the bore-holes should be put to get the best results. Great care is necessary in this respect, owing to a property I have observed either in dynamite or in the rock, or both, but which I have not seen when using ordinary blasting-powder. The property I speak of is that of smashing the rock to powder round the hole, and of breaking it off too short. This defect I have on numerous occasions observed, and we now provide for it by putting in the holes closer together. If the position and direction of the holes and the shape of the bottom or face admit of it, we charge several holes at the same time, and connect them at one operation to the electric cable. Often it is a great advantage to explode several holes in this manner simultaneously. When we have a solid bottom or face our ordinary practice is to put in three holes about 4 ft. apart from each other, and bore them in such a direction that the holes describe the angles of a triangular pyramid, with its apex at the bottom of the holes. It is astonishing to one who is unacquainted with it to see the effect of three holes bored in this manner and exploded altogether simultaneously, as they always are in our method of

Exploding by Electricity.—When introducing this new system of mining Mr. Brain was not so much a stranger to this portion of it as to rock-boring machinery and the explosive, owing to his having employed electricity for signalling underground at Trafalgar Colliery, Forest of Dean, for the last ten years. Electric signals and electric blasting are not, however, the same thing, and at first he had to find fuses that would explode the powder with certainty. There were no mining fuses for blasting by electricity except those made by and bearing the name of Professor Abel. These fuses are excellent articles in the laboratory, and very safe and certain in experimenting with in the same state as they leave the maker's hands, but they are not made to fit the dynamite caps, and are too delicately constructed for mining purposes. We found when we began to use them in the shaft that they frequently missed fire, and although we tried for several months we never succeeded in exploding with many fuses in succession with certainty, whereas for simultaneous blasting they are so slightly constructed that they cannot be depended upon, especially when the connections are made by the miners. In consequence of this Mr. Brain went to work to try to make fuses himself that would not possess the defects of those of Prof. Abel, and, although it was a difficult task, he at length succeeded. For the last two months, with fuses made by Mr. Brain, we have not had a single missing fuse in the shaft, and during this time we have fired on several occasions six shots, and every day four shots, simultaneously. These fuses of Mr. Brain can be used without any danger of damaging them by any miner with ordinary care. Mr. Brain makes two different fuses, one for high tension electricity, and the other for a battery of low tension, nine of which can be exploded simultaneously with a battery of twelve cells. This reduces the difficulties of insulation, and lowers the cost of the apparatus to a trifle. Twenty-four fuses can be exploded at one time by means of a dynamo-electric machine.

The method adopted for exploding in our shaft is by means of a battery of ordinary Leclanche cells. The two poles of this battery are connected by means of insulated wire, one to one end of a tapper, and the other to the earth wire down the pit. The other end of the tapper is connected to the insulated cable, which also goes down the pit, so that until the tapper is put down there is no connection between the charged holes and the battery. The instant the tapper is put down the circuit is complete, and the charges are exploded altogether. The tapper, which is kept up by means of a spring, is enclosed in a locked box in the cabin on the top of the pit, the key of which is always carried by the leading sinker, so that it is im-

possible for the men to be shot by any means. The absolute safety, under all circumstances, of this system, independently of the save of time and gain of power by several holes being exploded together, is sufficient to recommend it to everyone engaged in the generally considered dangerous occupation of blasting. The system is now for the first time made known. I have been careful to abstain from anything like exaggeration, and to confine myself simply to a description of what we have tried and what we are now doing. The system is much liked by our workmen, and is not disliked by the men in our neighbourhood, although some of these have but an indefinite idea of it. One asked the banksman the other day what it was that we were doing here. The banksman replied that we "Bored the holes with the wind, and fired them with the lightning." "Wind," an "lightnin'" says querist. "Where do 'em keep the lightning then?" "In this box," says Bradley, showing him the tapper box in the cabin. We have had numerous little difficulties besides those enumerated in the foregoing; I will, however, mention only one more—that of boring the holes perfectly round. This, although I believe never accomplished before with a percussive chisel, we are now, under all circumstances, able to do, as anyone may see who will take the trouble to examine our bore-holes after they are bored.

I call the system after the name of Mr. W. B. Brain, St. Annals, Gloucestershire, our chief engineer and managing partner, because he was the first to combine the three principal elements, not that he has invented anything belonging to it, except in the matter of the fuses and the sinking stretcher. Besides combining the three elements into one system, he it is who ventured for the first time to work a boring-machine without legs in a shaft, and he alone it is who has successfully introduced electrical blasting into mining in such a simple form that it can be used by any miner of ordinary intelligence.

SAMUEL DAVIES, Manager.

Drybrook Iron Mines, Mitcheldean, Gloucestershire, Sept. 15.

VIRGINIA: ITS ATTRACTIONS TO THE CAPITALIST AND THE EMIGRANT—No. I.

ITS MINERAL WEALTH AND NATURAL RESOURCES.

We have from time to time drawn the attention of our readers to the decline of our exportations of coal and iron to America. We now recur to the subject as one of vital interest to our commercial prosperity. Up to a very recent period our American cousins have been amongst our best customers for our iron goods, which we, from our great abundance of cheap coal and ore in close proximity, and our commercial skill and enterprise, have been able to manufacture at a cheaper rate and of a superior quality than was practicable in a new country, with less labour and capital at command than were possessed by the Mother Country. We propose now to point out some of the causes which have led to the falling off in this branch of our commerce, and to the dangers which threaten one of our staple manufactures.

The rule and basis of trade is to buy in the cheapest market and sell in the dearest; and hitherto we have been able to hold our own and command foreign markets, in spite of distance, high freights, and protective duties. But the moment we cease to manufacture an article, and deliver it at a cheaper rate than it can be produced by our customers, then the inevitable consequence is the loss of that trade; and in some instances it is asserted that this will soon be the case with our iron trade with America. The demand for our iron has already sensibly diminished, and high prices have so stimulated enterprise on the other side of the Atlantic, that unless we can reduce the cost of our manufactures the trade must soon cease altogether, and our best customers become our rivals in the race of nations for the supply of the markets of the world. This is so serious a matter that we intend from time to time to recur to the subject: on the present occasion we desire simply to draw attention to the fact, and then show our capitalists that if they desire to share in the profits of any manufacture they will do wisely to take part of their capital to such centres as will enable them at least to manufacture the raw material at the cheapest cost. For instance, if coal and iron ore are cheaper in any place than in England, other circumstances being equal, they will be able to produce iron at a rate that will enable them to import it here at cheaper rates than it can be manufactured in our great centres of the iron trade.

This is the case with iron in some parts of America at this moment. The *Standard* of Saturday the 17th says—"The *Pittsburg Commercial* states that two lots of Lake Superior pig-iron, one of 2000 tons and one of 3000, have been ordered at the furnaces for shipment to England." Some iron has actually been sent here, and the only reason why this is not so more generally is that the consumption in America is so great, and the demand so enormous, that all that can be at present produced on either side of the Atlantic finds a ready sale on the spot. This, however, cannot long remain so: high prices have so stimulated enterprise that the make of iron in both countries is likely, sooner or later, to overtake the demand, and then will come the competition where the race will be to the strong, or, in other words, to those who can make the article cheapest and best. Let us just glance at the prospects of our iron trade with America from this standpoint. We will start from Richmond, the capital of Virginia, on the James River, on a journey west by the line of the Chesapeake and Ohio Railroad, recently completed to the Ohio, opening up 20,000 miles of inland navigation, and which passes through one of the most lovely countries on the face of the earth, where it is difficult to say whether it is richest in the mineral wealth stored up in its mountains, or in its agricultural resources—where the climate is healthful and delightful, and where all the necessities of life can be raised with the least labour; where the lowlands still produce 50 bushels of corn to the acre, though the land has been under cultivation for many years in succession without manure; and where, therefore, labour should be, and is, cheap. This, we may add, should be a significant warning to our Trades Unions, for if they raise the cost of manufacture too high they will destroy their trade altogether.

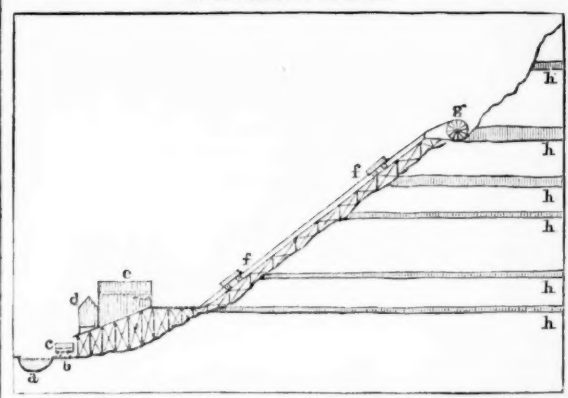
Passing from the coast towards the Alleghanies, which run in a north-east and south-west direction, and extend from New York to Alabama, the railroad crosses the Blue Ridge, from which a view of some of the most magnificent scenery in the world is obtained. Throughout the greater part of the extent of the Alleghanies, from Maryland through Virginia and Kentucky to Alabama, on the western slopes of these mountains are found enormous deposits of the purest hematite iron ore, cropping out from the surface on the hill sides. These deposits are no mere pockets, but the ore, being mostly hydrate, is usually found in regular veins of stratification, averaging from 10 to 20 or even 40 ft. in thickness and upwards, underlying a hard sandstone, which, being more easily acted upon by the elements, is more quickly eroded, and often leaves the ore standing out in large bluffs or masses, inviting the hands of man to utilise and turn to profit the wealth so prodigally placed within his reach. When near a railway or navigable river these ores can be mined and placed in the railway cars, or in barges, at less than \$1, or at about 3s. 6d., a ton, and under favourable circumstances for 75 cents., or about 2s. 9d. per ton.

Proceeding westward through the Alleghany tunnel we pass into the new State of West Virginia and cross the great watershed of the continent, the gradients being down hill, and the streams all flowing towards the Ohio instead of to the Atlantic. We now pass over the great limestone regions, and in about 100 miles from the chief iron ore region come to the wonderful deposits of coal on the New River and the Kanawha. The rail, be it observed, is laid on the banks of these rivers, to avoid engineering difficulties. There is, therefore, now the means of cheap transport, the rate being about 1½ cents per ton per mile for freight by railway, or \$1½ for 100 miles. The iron can, therefore, be conveyed to the coal, or the coal to the iron, at a very easy rate.

We have now arrived at the coal region, which is, perhaps, one of the finest on the earth; it is, at any rate, one of the easiest workable of any we know. There are in the centres of the coal field at least 10 or 12 workable seams of cannel, splint, and bituminous coal, all above the level of rail or river, some of the seams actually cropping out on the level of the railway. There are no faults or danger-

ous gases, and the coal is won by open adits, or levels, driven into the sides of the hills, no shafting or hoisting apparatus being required, and seams of less than 3 or 4 ft. in thickness are not heeded. The coal, when won, is run down the hill sides on an inclined plane, or tramway, the descending cars drawing up the empty ones, after what is called "dumping" the coal over screens into barges on the river, or cars placed on sidings to receive it. The cost of the coal,

DIAGRAM SHOWING THE METHOD OF CONVEYING COAL DOWN THE HILL SIDE TO THE RAILWAY OR RIVER.



a. Bed of the river. b. Railroad level. c. Railway car. d. Screening shed. e. Landing shed. f. Incline. g. Break drum, by which the descent of the coal cars is regulated. h. Coal seams, of which in parts of this district there are as many as 12 or 14.

delivered into the cars, is not more than \$1 per ton. The seams dip at a gentle incline of from 20 to 100 ft. (never more) to the mile, so that there is no water in the mines, or pumping required, as it all runs out of the mines by gravity, the coal being worked upwards as regards the dip of the strata. The coal, when mined, is put into trucks and run to the entrance to the drift on tramways placed on this gentle slope, with little manual labour, as the car with its load is also assisted in its course to the mouth of the adit by gravity.

We had almost forgotten to call attention to the fact that the roof of the mines is so good that little or no timbering is required, and any that may be wanted may be had for the cutting from the primeval forests that clothe the mountains with some of the finest timber imaginable. Of the quality of the coal we do not now propose to speak, that will probably be the subject of a future article. All we now wish to say about it is that it is of very superior quality, especially the splint, which is used with charcoal in the smelting of iron, which still passes as charcoal iron. It is so pure and hard that it is used raw, without coking. It is needless to say the iron from these pure materials is of most excellent quality, and is used for car-wheels, &c., and fetches a high price in the market. During the late disastrous war, by reason of the blockade, the Southerners were put upon their own resources, and to make iron for their cannon and shot they put up small charcoal furnaces on the line of the outcrop of the iron ore, and vast profits have been since made by these furnaces, which, at great consumption of charcoal, only produced about 5 or 6 tons of metal daily. These will now give way to large furnaces, burning splint coal or coke from the bituminous veins of coal, now brought within easy distance of the iron by rail. This coal, although long since known to exist, was inaccessible till the opening of the railway, a few months ago.

The result will be that the charcoal iron will give place to coal or coke made iron. At Pittsburg, the Black Country of America, they have to obtain their best iron ore from the iron mountains in Missouri, or from Lakes Champlain or Superior, at a cost of \$14 and upwards per ton, whilst iron can be made in the Kanawha Valley at a cost little exceeding that of the ores in Pittsburg. The result will be the transfer of the manufacture of the iron to a large extent to the Kanawha district, where iron of the best quality can be made at a cost not exceeding 2½ lbs. a ton.

In our next paper we propose to contrast these figures with the present state of the iron manufacture in England, and to show what great inducements there are for the emigration of our surplus capital and labour to these newly-opened fields of enterprise.

RAISING WATER FROM MINES.

An interesting paper upon this subject was read before a recent meeting of the Midland Institute of Mining Engineers by Mr. W. P. MADDISON, in which he contends that the ordinary system of pumping a vast amount of effort is expended uselessly in propelling large masses of material and machinery, liable at any moment to all kinds of mischance and accident, placing in jeopardy the very existence of the mine in which it is situated. Latterly, he remarks, there has been an evident desire shown to escape these constant risks and dangers in the avoidance of spars and moving material in the shaft, by carrying the steam from the surface to the bottom of the shaft, and there bringing it to bear upon the water by passing it through an engine, and forcing the water through pipes to the surface or other place of outlet, and to some extent it is possible that such method has been attended with success, but in all cases there still remains constant and imminent danger of splitting of pumps and other casualties attending the system of lifting the whole column by, as it were, spasmodic efforts at each movement of the engine or plunger—counterbalanced, it is true, to a very small and limited extent, by the use of air vessels in order to lessen the damaging effect of, first of all, suddenly propelling the column of water at an undue and dangerous speed, then as suddenly removing such application of power, with the very damaging effect of permitting the rising column to descend with tremendous effect upon the clacks and valves below. And we cannot ignore the fact that a large and serious loss prevails by the condensation of steam in its passage through pipes carried down a shaft, and which actually increases in proportion to the distance.

To obviate the inconveniences referred to Mr. Maddison proposes the direct application of compressed air, and to dispense with ordinary pumps altogether. According to his arrangement a main open tank is constructed, into which the water is received from the sump, by means of an inlet pipe with sluice valve for shutting off supply; or the supply is taken into the cylinders, or compressors, direct from the sump, conducting it by an inlet with a clack seat and a valve to prevent return—thus dispensing with the open tank. Within the main tank, or otherwise, one or more cylinders or compressors, of any convenient shape, are fixed, into which the water from the main tank or sump is conducted by an inlet with a clack seat and valve to prevent return. A communication is then made from the tank cylinders or compressors by a horizontal outlet pipe to a vertical main passing up the shaft, or otherwise. Any number of cylinders or compressors may be used, it only being necessary to unite them by separate outlets to the main. Above each compressor an air chest with slide is fixed, by means of which compressed air is admitted into the compressor, and, in like manner, to all the compressors through pipes or junction tubes, with flanges bolted, riveted, or screwed to the covers of the cylinders or compressors. Each compressor has a separate clack valve to prevent the return of the water, when once received from the open tank or sump.

This arrangement may be made self-acting, by means of floats and valves, connecting each cylinder or compressor with a second or a third cylinder, acting alternately upon each other. The float in one causing a valve to be opened for the inlet and outlet of compressed air into and out of a second, and the float in the second cylinder operating upon a third in like manner. Or each air chest or slide may be provided with a spindle or piston rod passing through a stuffing box, and worked by a small engine, or apparatus, driven by compressed air or other means. Or, as in the case of levels of mines, where a limited amount of water has to be discharged, the cylinder or compressor may be immersed in water, in a sump made

for the purpose, or otherwise, and fitted with inlet and outlet pipes and valves for water and compressed air, and worked by hand or by float and self-acting arrangement, previously described. An inlet and exhaust are provided for each compressor, and consequently, when these are filled, or nearly filled, with water, and the pump set in motion, the compressed air rushes into the cylinders, and, acting on the surface of the water, forces it through the eduction tubes direct to the vertical main, whence it escapes by any convenient outlet, and is discharged at a higher level.

When the cylinders or compressors are thus emptied of their contents, the compressed air is permitted to discharge itself by separate exhausts, after which the cylinders will become re-filled with water by the self-acting clack valves.

Meetings of Public Companies.

NEW ROSARIO SILVER MINING COMPANY.

The ordinary general meeting of shareholders was held at the company's offices, East India Avenue, on Monday, Mr. JAMES GOODSON in the chair.

Mr. HEARN (the secretary) read a letter which had been received last morning from Mr. Cumins, the company's superintendent, the substance of which will be found, under the head foreign mines, in this days Journal.

In presenting their third annual report to the shareholders, the directors are gratified at being able to state that considerable progress has been made in opening two of the company's mines—the New Rosario and the Providencia. Operations hitherto have necessarily been confined to sinking shafts and winzes, with the view to the active and systematic development of these two mines, and it is most satisfactory to note that, simultaneously with these operations, ores are being laid open and returns beginning to be made, which it is estimated will be greatly increased as depth is attained. The fruits of a small portion of these workings will soon be received in this country, as Mr. Cumins, in his letter of July 12, writes: "I have handed to the Real del Monte Company, for safe custody to Mexico, a box containing 217 marcos of silver value about £350, and have requested Mr. Potts to forward it to London without delay." The tortoise pile of ore, from which this box of silver has been extracted, was reduced in the hacienda of a neighbouring company for the purpose only of testing its quality; but Mr. Cumins does not propose to continue the reduction of the company's ores on commission, as not being the most profitable mode of realising them. The important question of reducing the ores to the greatest advantage, has engaged the anxious attention of Mr. Cumins, in Mexico, and of the directors here. Mr. Cumins has examined several haciendas that are for sale, but found them to be in a dilapidated condition, and situated at too great a distance. He, therefore, considers it would be preferable to build one on the company's own ground, in close proximity to the mines, should other means of reducing the ore, as referred to below, not be possible. Extensive works are now in process of construction at Real del Monte by some Californians, who speak confidently of being able, by a new system, to reduce large quantities of ore with great rapidity and at a very trifling cost. On this subject Mr. Cumins writes as follows in his report for May last: "The Californians are having their machinery for reduction made in the City of Mexico, and have agreed to bear all the responsibility and pay the loss if they fail. They have examined the ores, and say they are sure of success, and will reduce a thousand or more marks (i.e. 150 tons) in 24 hours (look at the saving of time alone at a cost of only 812 the month). Now, two marks are worth \$15, from which deduct \$12 for reduction, and \$1 for extraction and dressing; and thus even two marks would have a profit of \$1 on every month, and what part of our ore will not assay more than this? Judging our top stops without having them tried, I think they will average from 6 to 10 marks up to surface; and if the American process of reducing it is found to answer, this way will pay as well, and better if the time is taken into consideration, than 15 to 20 marks under the present system. In a very few months the matter will be decided, and if successful, the company will have a fortune at our present death and without going deeper, which however we shall not delay doing for rich results." Mr. Cumins has, therefore, judiciously determined to await the result of these trials before deciding upon any plan. In the meantime the directors have taken measures to test the comparative advantage of having the ores reduced in Mexico, or of having them concentrated there, and shipped for reduction at Swansea, which the opening of the Mexican Railway to Vera Cruz has now rendered practicable. While these experiments and investigations are being made, the reserves of ore are accumulating, as stated by Mr. Cumins, and their realisation is only a question of time. The directors are not insensible to the importance of reducing them, and extracting the silver to as large an extent and as quickly as possible; but as the erection of a hacienda necessarily involves a considerable outlay, and other important considerations, they deem it best to forego returns for a short time, in order that the company may have the full benefit of their neighbours' experience and outlay. In following a deposit of guano in the Rosario lode it was found to be dipping fast towards the boundary of the sett. Mr. Cumins, therefore, at once applied for an extension of the sett, which he succeeded in obtaining, as shown by the following extract from his letter, dated Jan. 27, last: "It being apparent in descending, that the sett had an inclination to dip towards the south, we have secured an addition of more than half a sett in that direction, which will now allow us an ample range from our former boundaries. The fees have been paid, and I am now in the possession of the title and the ground."

Of the ultimate success of the company's mines the directors are assured there can be no possible doubt, all that is wanted being time and labour to lay the lode open to a sufficient depth and extensively enough to yield a large produce, which may be expected to be obtained at much less depth than in the neighbouring setts, the mines being situated in a deep ravine, about 150 yards below those of the Real del Monte Company (Mr. Cumins' report for September, 1872). Of Providencia, Capt. Skewis says: "It is a continuation of the great Carretera lode, which has yielded such large profits to the Real del Monte Company." In his report for March last he writes as follows:—"It is one of the finest lodes I ever saw. We have got it now about 6 varas wide in the pit, and have not got to the eastern wall as yet, and the further we open it out the better it is looking. And in his report dated July 26, and to that hand, he says in regard to the Providencia (south end): "I believe in this place or on this junction (with the Grand Campaign lode) that we shall have ore enough to make our company one of the best in the Real del Monte Company, and I can say with a clear conscience that it is the best prospect I ever saw. If the Americans succeed in their reductions we can very shortly give them 1000 carcas (150 tons) a week, gradually increasing the amount to 2000 carcas (300 tons), and in less than six months we shall pay all the cost of the mine from the commencement, and be giving dividends."

We have also the independent testimony of Mr. Honey, one of the officials of the Real del Monte Company, as well as that of Capt. Nichols, one of the capitalists of the same mine. Mr. Honey reports:—"The great lode of La Providencia of Real del Monte is in the whole district, and Capt. Skewis states that Capt. T. Nichols is of opinion that the Providencia lode is superior to anything he has seen in the country."

Of the New Rosario and San Pedro Mines, Mr. Honey writes as follows:—"These mines are abounding with a great number of silver lodes and veins of the richest quality. I judge by the appearance of the back of each lode they will be productive of a great amount of silver ore, and especially at about 50 or 60 varas deep; and these lodes form several junctions below one with the other, and these junctions will turn out an immense quantity of silver ore, much superior in quality to that found on the surface of the lode. I see that the Rosario lode is cut rich, which is not surprising to me, as it only confirms my former statement and opinion. I will further add that the Rosario lode will be more productive in the New Rosario Company's setts, which have the course of the same lode, as the country or rock about it is so congenial for ore. I have a very good opinion of the San Pedro lode also; I think that lode, properly developed, will stand on a par with the Rosario—if not in quality it will be made up in quantity."

The directors are gratified to find that the united testimony of these experienced miners is highly favourable to the company's prospects, and that the large and productive lodes of a continuous and permanent nature, and not mere chambers of ore, as has been the character of so many of the silver mines in the United States. In his report on the company mines, Mr. Honey speaks of the "Providencia" as follows:—"Before the lode gets settled, which will be at a depth of about 100 to 150 varas, there must not be expected very large quantities of ore. I calculate, however, that at about that depth and below, with sufficient levels driven, there can be employed from 400 to 500 men in breaking rich silver ores, which will give from 3000 to 4000 carcas weekly (450 to 600 tons). Valuing this ore at only the average produce of the whole quantity reduced by the Real del Monte Company up to 1865, which amounted to \$25,738 tons, and produced \$4,935,777, or 131.4s. per ton, it would give a return of from 60000 to 80000, per week, or (say) from 300,000 to 400,000, per annum, and from this only one of the company's four mines."

The prospects of the mines, as indicated in the results obtained by the present limited development, appear to the directors to justify the expectation that some such measure of success as above referred to is now only a question of time, which they are using every endeavour to shorten as much as possible.

As regards the financial resources of the company, the directors have much pleasure in stating that at the present time the amount in hand, with that due on calls, is about £9000, whilst there remains to be called up on shares allotted £7400, showing in the aggregate the sum of 16,400, which will, it is believed, amply suffice for the full development of two of the company's most important mines—viz., the Rosario and Providencia, upon which operations are now being vigorously conducted.

Mr. GOODSON congratulated the shareholders on the company being now in a very favourable position, and on its undoubted prospects of soon being in a state of great prosperity. He also referred to a process for reducing silver ores, at a very trifling cost, now being tried at the Real del Monte Company's Mines, the result of which Mr. Cumins was waiting to see before putting up a reduction works on the old plan. He further said that the directors would be happy to answer any questions, and concluded by moving—"That the report and accounts annexed be received and adopted."—Mr. ROBERT SMITH presumed that the accounts had been audited, although not signed by the auditor.

The CHAIRMAN replied that, although the auditor had been seriously ill, yet he had audited the accounts and signed the balance-sheet.

Mr. R. SMITH enquired whether he was right in inferring from the accounts that, besides the balance in hand, and 24790. 16s. 3d. due on calls, there was about £9000, still to call up on the shares allotted besides the 5225 shares still to be issued to complete the whole 50,000?—The CHAIRMAN replied that such was the case.

Mr. SMITH also asked whether the company held the entire mines, or only about two-thirds, as customary in Mexico?

The CHAIRMAN: We are proprietors of 15-24ths of the New Rosario, and of 14-24ths of the Providencia Mine.

Mr. TANNER: The expenditure on these two setts is kept distinct in our books, but not in the accounts now laid before the meeting.

The CHAIRMAN: We will send round amended accounts, giving fuller explanation of the points referred to, and I therefore propose that the resolution I moved

"That the report and accounts be received and adopted," be put, minus the words "and adopted," in future, and that Mr. Cumins and Capt. Skewis be requested to prepare a report of all the work done during the previous year for the next annual general meeting, to be sent to the shareholders with the directors' report. I think also that Capt. Skewis should confine his reports more to what actually is, and not to what he hopes will be.

The CHAIRMAN: The next business is the re-election of directors. Mr. Davis offers himself for re-election, and he has attended to the company's business so closely, and is so experienced in mining, that I beg to move his re-election.

Mr. McCulloch seconded the motion, which was agreed to. The CHAIRMAN moved, and Mr. F. H. SMITH seconded, the appointment of Mr. Cecil Wray as a director, which was agreed to. Mr. GEORGE SMITH regretted the illness of Mr. Spooner, but as it was necessary that the account should be at once remodelled, he proposed the election of Mr. Swaffield as auditor, which was carried unanimously.

Mr. SWAFFIELD, in returning thanks, said he was accustomed to Mexican accounts, and would undertake that they should be presented in a satisfactory form. Mr. CAVE said he was glad to say that the company's mines were turning out beyond all expectation, in support of which he would refer to Mr. Sewell.

Mr. SEWELL then read extracts from his report, the purport of which was that the shareholders in the New Rosario Company would soon be in a very enviable position.—The thanks of the meeting were voted to Mr. Sewell, and to the Chairman for his frank explanations and his courteous conduct in the chair.

CARDIFF AND SWANSEA SMOKELESS STEAM COAL COMPANY.

The statutory meeting of shareholders was held, on Tuesday, at the Cannon-street Hotel.

Alderman Sir ROBERT WALTER CARDEN in the chair. The notice calling the meeting was read by Mr. JOHN RUSSELL CLIPPERTON, the secretary.

The CHAIRMAN said:—Gentlemen, the directors would not have called you together so early since the scheme was first brought forward had it not been that by statutory process of the Act of Parliament we are bound to call you together within four months of registration. Of course, in the first four months there is very little to report, but I have drawn up a few words that probably you might like to hear. This being the statutory meeting, held in pursuance of the Act of Parliament, the directors have pleasure in submitting a few brief particulars of the progress of the company. The applications for shares were very numerous, but after mature consideration your directors decided that the capital originally stated in the prospectus would be greater than could be advantageously employed, and therefore they resolved to allot only 20,674 shares, thus reducing the number of shares by 6000, and making, with the vendor's shares, a total capital of 340,000, instead of 400,000. In August last there was on deposit with the National Discount Company (Limited) 58,000, and in the bankers' balance, made up of 57,000, at the disposal of your directors, who considered it would be better employed than in paying off the first one-third of the 6 per cent. debentures, which otherwise would have fallen due in three years' time. Accordingly, and finding the proposal met the views of the vendors, the sum of 50,500, has been paid to them, while an *ad interim* dividend has just been paid to the shareholders. In accordance with the Articles of Association and the terms of the prospectus a call of 1s. per share is due on Oct. 1 next, which will place at the directors' disposal (including balance at bankers) about 30,000, a large portion of which will be absorbed in the further development of the works, and the cost of additional shares now being erected. In regard to the properties themselves, the company took possession as from May 1 last, and Col. Shakespear, F.R.S., late of the Royal Artillery, one of the directors, has visited them twice, and having made a careful and minute investigation of the mines, machinery, plant, &c., and checked the inventory, has drawn up an exhaustive report, in which he expresses himself thoroughly satisfied with the state of progress and means of development and future prospects of the collieries. (Cheers.) I do not know that it will be necessary to enter into any accounts, but perhaps it will be satisfactory to you to know what progress has been made in the past three months. After paying the *ad interim* dividend to the shareholders, and likewise allowing for the dividend being worked, the company has about four or five years ago. Only two levels were here, but in good condition, and capable of good service for years to come. The Tyra colliery was at right angles to the Cwm, and its incline running parallel to the railway, ascended about 800 ft. in a distance of 2500 yards, and the slip of the coal being about 1 in 12. Five levels were being opened into the hills from different heights along the incline. At present Nos. 1, 2, and 3 levels only were in a working state, and from them more than about 70 tons a day were being sent down. Nos. 4 and 5 levels would take a little time to complete, but in time were being sent down in the efforts to develop the capacity of the colliery. When all was completed Tyra would give a daily output of from 120 to 150 tons per day on the average of each level, or say 500 or 600 tons a day. As soon as the new railway siding at Resolven was completed, that at Tyra would be given up, as it was inconvenient and bad. All the coals from the five levels would then be sent down the new incline to Resolven, at a saving of cost of about 10000 a year. There had been some little delay in the arrangements with the Great Western Railway Company before the new sidings could be opened; but he was happy to say he believed the terms had been settled between the two companies. He might refer to the fact that they were going to try coal-sieving machinery, and that the Winstanley's patent on the far ground, but the unfavourable state of the weather had prevented them being set to work. He was happy to say the men had received the machines very well, and he believed they would be a success, and would increase the output very considerably. With regard to the cottages the first thing the board did was to order 100 of them to be commenced at once, close to the Resolven Station and the school. There were formerly 40 cottages, of which 30 were built last year, and there would be 100 additional, of these 14 would shortly be ready for occupation. The foundations of the others were laid, and they would consist of four rows of 25 each. Some would be finished in three months, and all in six months, and all as quickly as possible. He thought by the end of the year they would have the whole of the cottages ready, and he was afraid that would be so before they had occupants for all of them. To develop the collieries properly he believed would require about 800 cottages, and to accommodate them would require from 200 to 250 cottages.

Mr. H. RUSSELL EVANS said it was gratifying to find that the Chairman was able to put so satisfactory a statement before them, both as regarded the results of the three months' working and the general opinion expressed with reference to the intrinsic value of the property. With respect to the cottage accommodation at Resolven, there were two views to be taken of that matter. In times gone by he had no doubt it was possible to get men as fast as the cottages could be built, but he doubted whether it could be done now. The circumstances of the times were different to what they were two years ago. He believed their manager would tell them it was extremely difficult to get competent colliers. They might have a lot of agricultural labourers, but it took many months to make them good colliers. The remedy was to build cottages; he agreed with Colonel Shakespear that if it would take time to fill them, but it was better to get the men as fast as they could. With regard to the coal-cutting machines, he did not know how they would turn out, but it was an experiment of the greatest interest not only to this company but to the country at large. He hoped in the trial they made of the machines it would draw every possible attention, and that they would be able to use them successfully. He believed the great success of collieries depended upon the employment of machinery instead of manual labour. With regard to the average weekly output of coal, it so happened that there were many holidays during the three months of the company's possession, and difficulties arose with the men, and he thought, if they counted the actual working days, the average output was as near as possible equal to that of the four first months of the year. With regard to the Pentre Colliery, he had a very high opinion of it; he thought it would prove a rich plant for the company. It was splendid coal, and he thought there would be no difficulty in increasing the output pretty rapidly, all circumstances being tolerably favourable. There was one matter he would mention which had not been touched upon. He referred to the proposed Iron and Coal Owners' Association in South Wales. As a shareholder in the company, holding a considerable stake, he did not wish to ask the directors to pledge themselves to the meeting, but he hoped they would exercise great caution with respect to binding themselves in connection with that association. It might suit the circumstances of other collieries, but it might not suit theirs. He, however, had every confidence that the directors would deal with that, as in all other matters, in a way which was best for the interests of the company. He should, at the proper time, have great pleasure in proposing a vote of thanks to the directors for the attention they had paid to the affairs of the company during the time they had had them in their hands.

After a conversation with reference to the shares of the company not being quoted on the Stock Exchange,

Colonel SHAKESPEAR wished to say a word or two with reference to the Pentre Colliery. It was, in his opinion, a most valuable and compact little colliery of about 500 acres. A portion of it consisted of a large hill, and about 500 ft. up it they were working a stone quarry, from which they obtained stone at a cost of 1s. 4d. per ton, which they could sell at 6d. but they used it for their own operations. They were opening a seam in that district which was house coal of very excellent quality. They had constructed an incline of about 350 yards to the Taff Vale Railway. They were working that colliery to the utmost of their ability. A little lower down the hill was the new shaft they were sinking. That was 15 ft. in diameter. They had got down about 40 yards, and there were about 150 yards more to go. From that pit they might expect an output in about another year. It was about 50 yards from the old pit, and they were driving levels from the 4-foot and 6-foot seams to form a junction with the new shaft when that was completed. From that new shaft there was a new siding about 300 yards long,

with a gentle incline down to the railway. Every effort had been made to make that portion of the property into working condition, and the boilers and engines were already on the ground. They were putting up a 40 ft. fan to ventilate the lower measures, in preference to the old system of the furnace, and the directors were advised that it was more economical. He thought Pentre would prove to be a mine of wealth. In three of the seams there was excellent ironstone, and the board had ordered a brick-making establishment to be set up at once, the importance of which might be judged of from the fact that a neighbouring colliery was paying 51s. 6d. per 1000 for bricks from Worcestershire. The company would, therefore, save a considerable sum by making the bricks for their use.

After some further unimportant discussion a vote of thanks was passed to the Chairman and directors, and the Chairman having acknowledged the compliments the meeting broke up.

* Colonel Shakespear wishes us to state that the "output" of last week averaged 560 tons a day, but the return did not reach him until the day after the meeting.

MARBELLA IRON ORE COMPANY.

An extraordinary general meeting of shareholders was held at the City Terminus Hotel, on Thursday.

Mr. GEORGE ANDERSON, M.P., in the chair. Mr. J. RUSSELL CLIPPERTON (the secretary) read the notice convening the meeting.

The CHAIRMAN said it would be in the recollection of shareholders that at the last meeting the directors were empowered to make the best settlement they could with the Messrs. Malcolm's unfortunate failure. The settlement is as follows:—the 50,0000 worth of shares held by the trustees as security, or guarantee, has been given up to the company entirely, and in addition the royalty which the company held for five years as further security for the guarantee has been given up, not only for the five years, but in perpetuity; the company also were allowed to keep the sum of 10000 towards paying the legal expenses, and 5000, in connection with the payment for a small part of the mine. It was arranged that, in consideration of the settlement, there was to be no ranking in any way, and no money was to pass from either party. At the time of the settlement there was a balance due from the Messrs. Malcolm of 2000, which had been waived. So far as the directors can judge the settlement was a remarkably favourable one for the company, considering the unfavourable circumstances under which it had to be made. The company got quit of 50,0000 of stock, practically reducing the capital upon which to pay dividends from 500,000 to 250,000, while the royalty at the lowest estimate was worth 50,000, so that the company had benefited somewhat near 100,000, by the settlement, in losing 45 years' guarantee from the Messrs. Malcolm. The reason for the shareholders to pass the resolution to be now submitted was because the solicitor, Mr. Consett, advised that by the Articles of Association the company was prohibited from investing capital in its own shares, and that it was very doubtful whether an arrangement he had indicated was not a violation of those Articles. For that reason the directors thought it better to err on the safe side, and take legal power for the directors to hold those shares. It had been suggested, by a gentleman who had come to represent the Glasgow shareholders, that the wording of the resolution would be able to do a great deal better. They could not, however, make any change of the kind whatever. The words were really dominated by the amendments of the resolution. It was for the purpose of settling or compromising the mutual claims of the company with Messrs. Malcolm, and nothing else. But he believed have the slightest hesitation in giving the directors a pledge that the shares would not be dealt with except in the way sanctioned by a special general meeting of shareholders. He begged to propose the following resolution:—"That the 204 Articles of the company's Articles of Association be, and is hereby, modified by adding thereto the following words:—'But I shall nevertheless be lawful for the directors of the company, for the purpose of settling or compromising the mutual claims of the company, and matters in dispute between the company on the one hand, and the said William Malcolm and Samuel Smythe Malcolm, or their trustees in liquidation, on the other hand, to accept the surrender of or to purchase any fully paid-up vendors' shares, or any interest therein, on behalf of the company, in consideration of such payments or surrender of rights by the company, and generally upon such terms as the directors shall approve of, and to cancel or otherwise deal with such shares or interests therein when so surrendered or purchased.'"

Mr. SEWELL seconded the proposition.

Some discussion ensued relative to the wording of the resolution, which resulted in the number of the shares (5000) being substituted for the word "any," adding the words "such dealing to be determined at a special meeting summoned for the purpose."

The CHAIRMAN, in reply to questions, stated that, if they could judge by the claims upon Messrs. Malcolm, the estate would possibly not have paid 1s. in the pound to the company, and at the utmost 1s. 6d. to 1s. 9d.; therefore, it appeared to the directors they would have been throwing away their opportunity by accepting any ranking at all. If the company turn out prosperous—which they fully believed it would before these five years are passed—they would be in the comfortable position in perpetuity of having no royalty to pay.

The resolution in its amended form was put and carried unanimously.

The CHAIRMAN was sorry to say that he was not able to give the shareholders a very flattering account of the company's position. They had been met with the great and unexpected difficulty of changing the work at the mine from open face to ordinary mining, and in consequence of the extremely hard rock met with little progress had been made, so that the output for the six months of the year had been extremely small—20,352 tons; but for the present had put the company in a position to do a great deal better. They could not, however, make any advance while there were so many difficulties of one kind and another. The position of the company was not having their works stopped; still, the difficulties were such that they could hardly work anywhere without the danger of bringing down some portions of the mountain upon them. They were working very bad contracts, under which it was quite impossible to make anything like a proper profit. When the contract was started they were assured by everyone that it was quite attainable, and contracts were taken accordingly. At the end of June the contracts were 210,000 tons still to deliver, but since then they had succeeded in cancelling one contract for 50,000 tons, and at the present moment had 130,000 tons to deliver at current rates, or prices that left only a small profit. They could not pay large dividends till they had done with these contracts, and until they also repaid the profit and the advantage of higher prices. Under these circumstances the balance of profit for the first six months of the year available for dividend was only 15321, which, added to the 111, carried forward from last year, makes the amount 14400, so that the directors did not feel warranted in declaring any dividend for the half year, but quite believed they would be able to do so at the end of the year, although he could not say what the amount would be. The expense of working the ore had been higher, and it was very difficult to reduce them in the way the mine was being worked at present. The total cost had been 9s. 1d., against 8s. 3d. per ton in 1872 for the ore on hand at Malaga. The cost per ton depended solely upon the output; as that increased the cost would proportionately diminish. The present output was very near the rate of 50,000 tons a year, at which rate it would take 2½ years to clear existing contracts, but they hoped to largely increase the output. Certain changes in the management were being made, which would result in a large saving of expenses both at the mine and at home, and it was contemplated to put a thorough practical miner in charge of the mine. The wire tramway had been far from satisfactory, one reason being the steepness of the gradient, but the alterations made which would enable the tramway to be worked much better, about 10 being taken off the gradient. The arrangements in connection with the directors were in an unsatisfactory condition—several directors had resigned since the last meeting, while some had been elected to seats at the board by the shareholders. A great deal of difficulty had been experienced with the three Scotch members of the board, who found it rather difficult to attend the meetings in London. It was suggested that one of the three should attend at each meeting, but that did not appear to work satisfactorily, for seldom either attended. It was then suggested that they constitute themselves into a committee to discuss matters the board had before them, and send up their determination. That, however, was not done—each of their 2000 per year each. His own opinion was that it would be far better to do away with the Scotch directors, and appoint London directors, but not so many. A resolution had been passed by the board cutting down their remuneration for the second year to one-half the amount provided by the Articles of Association, and that three-fourths of the amount should be paid according to attendance, but that was negatived by the Scotch directors.

A SHAREHOLDER asked what number of shares were held in Glasgow?

The CHAIRMAN said 2500, out of 25,000.

Mr. DOWNIE suggested that the directors' remuneration should be reduced. A SHAREHOLDER said that Mr. Downie, who represented the Scotch interest, suggested a reduction in the directors' remuneration, was really the mouthpiece of those who had received 2000 a year each without attending to perform the duties of their office. He could not see any necessity whatever for Scotch directors.

After some further discussion, a vote of thanks was passed to the Chairman and directors, which closed the proceedings.

INDEPENDENCE GOLD QUARTZ MINING COMPANY.

The third ordinary general meeting of shareholders was held at the company's offices, Royal Exchange Avenue, on Monday.

Mr. JAMES E. SMITH in the chair. Mr. DAVID CORNFOT (the secretary) read the notice convening the meeting, and the report of the directors was then submitted.

The directors informed the shareholders in February that unforeseen difficulties had prevented the mine being placed on a dividend-paying basis as soon as had been anticipated, and that some time must elapse before that position could be attained. Since then the various works had been pushed forward with vigour, and it was now anticipated that the mine would be in complete working order about the end of September or middle of October. The accounts submitted extend from the formation of the company to June 30. Early in the year the directors decided on making an alteration in the management of the mine, and engaged Capt. D. T. Davies, a gentleman of great experience, to take the management of the property in place of Capt. Rosewarne; they have every reason to be satisfied with the change, and believed the company will be benefited thereby. Rapid progress has been made with the bottom level east, and according to the latest report it was within 100 ft. of the east shoot, which the directors are assured will be reached in about two months time. They attach great importance to the intersection, as this chimney or shoot proved very rich above the adit level, the ore having averaged

ROCK DRILLING MACHINERY.



Brydon Davidson, and Warrington's Patent.

References, particulars,
Estimates, &c.,
Sent on application.

CHARLES BALL AND CO., lately Sole Agents for
THE BURLEIGH ROCK DRILL,
ARE NOW PREPARED TO SUPPLY THEIR NEW
ROCK-BORING MACHINE, OR "POWER JUMPER,"

Which they consider far superior to any other Rock-boring Machinery existing, and which they have, therefore, undertaken to bring before the public. The Firm's principle

"INVENTORS OF NONE—AGENTS FOR THE BEST"

Secures to its customers the best known machinery, as the Firm is entirely impartial in its adoption of any particular style of machines.

THE "POWER JUMPER"

Is recommended to the public on account of its qualities, which are the following. It is—

**CHEAPER,
SIMPLER,
LIGHTER,
SHORTER,
THAN ANY OTHER.
COMPARISON INVITED.**

Secondhand
**BURLEIGH DRILLS
FOR SALE.**

CHARLES BALL AND CO., Mining Machinery Makers, 21, NEW BRIDGE STREET, LONDON, E.C.

OSWALD BROOKE AND CO.,
51, DALE STREET,
PICCADILLY,
MANCHESTER,
PATENTEES AND SOLE MANUFACTURERS

OF
**GOVERNMENT
FIREPROOF
BRATTICE CLOTH**
AND
AIR TUBING.

WORKS: COLLYHURST.

McNIEL, MULLER, AND CO.,
39, MARKET STREET,
MANCHESTER,

SOLE AGENTS FOR { "S. B. HEMATITE,"
"S. B. YORKSHIRE," } PIG IRON
"CLAY LANE,"
"CLAY CROSS," }

AGENTS FOR JACKSON, GILL, AND CO., IMPERIAL
IRONWORKS, NEAR MIDDLESBOROUGH;
DARLINGTON WAGON COMPANY, DARLINGTON.

SCOTCH, HEMATITE, STAFFORDSHIRE, DERBYSHIRE, FOREST OF
DEAN, COLD BLAST AND REFINED PIG IRON, PUDDLED BARS AND
BAR IRON, STEEL, SPALTER, TIN, COPPER, LEAD, SHEETS, ORES,
BOLTS, NUTS, SPIKES MANUFACTURED IRON, &c., &c.



By a special method of preparation, this leather is made solid, perfectly close in texture, and impermeable to water; it has, therefore, all the qualifications essential for pump buckets, and is the most durable material of which they can be made. It may be had of all dealers in leather, and of—

I. AND T. HEPBURN AND SONS,
TANNERS AND CURRIERS, LEATHER MILLBAND AND ROSE PIPE
MANUFACTURERS,
LONG LANE, SOUTHWARK, LONDON.
Prize Medals, 1851, 1855, 1862, for
MILL BANDS, ROSE, AND LEATHER FOR MACHINERY PURPOSES.

THE GREAT ADVERTISING MEDIUM FOR WALES.
THE SOUTH WALES EVENING TELEGRAM
(DAILY), and
SOUTH WALES GAZETTE
(WEEKLY), established 1857.
The largest and most widely circulated papers in Monmouthshire and South Wales.
CHIEF OFFICES—NEWPORT, MON.; and at CARDIFF.

The "Evening Telegram" is published daily, the first edition at Three p.m., the second edition at Five p.m. On Friday, the "Telegram" is combined with the "South Wales Weekly Gazette," and advertisements ordered for not less than six consecutive insertions will be inserted at a uniform charge in both papers.
P. O. O. and cheques payable to Henry Russell Evans, 14, Commercial-street, Newport, Monmouthshire.

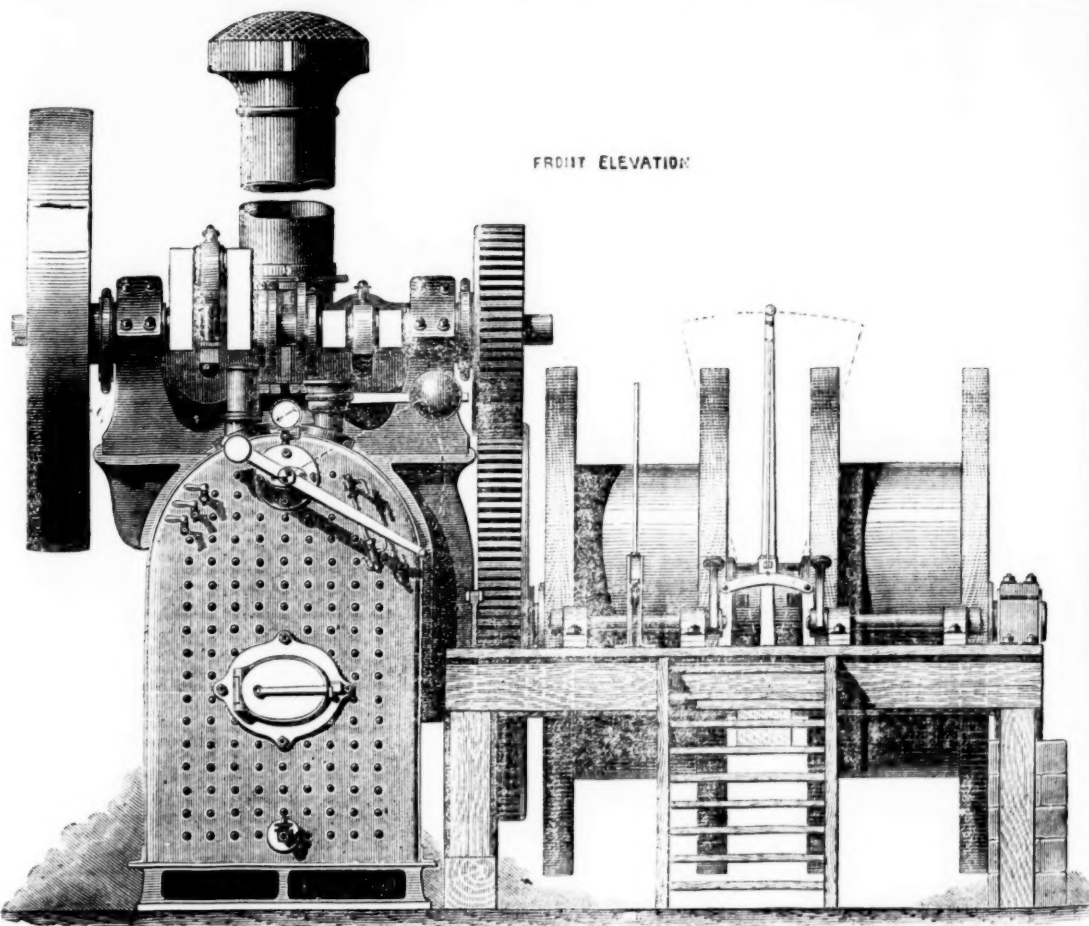
THE NEWCASTLE DAILY CHRONICLE,
(ESTABLISHED 1784.)
THE DAILY CHRONICLE AND NORTHERN COUNTIES ADVERTISER
Offices, Westgate-road, Newcastle-upon-Tyne; 50, Howard-street, North Shields; 195, High-street, Sunderland.

MINING PROSPECTUSES AND ANNOUNCEMENTS OF PUBLIC COMPANIES should be inserted in the BARNSTAPLE TIMES, published every Tuesday, and in the DEVON POST, published every Saturday, as these papers circulate largely throughout Devon and Cornwall, where many thousands of investors reside. Legal and Public Companies' advertisements, 6d. a line each insertion; Trade and Auctions, 4d. a line; Wanted, &c., 2d. words, 1s. Published by J. B. JONES, Bouthport-street, Barnstaple, Devon to whom all orders, by post or telegraph, should be sent.

HIBBERT'S NEW THEORY AND PRACTICE OF MEDICINE for HUMAN BEINGS; ditto, for Animals; price 1s. each. Publishers: SIMPKIN, MARSHALL, and Co., London; JOHN HEYWOOD, Manchester.

HIBBERT'S PATENT ANTISEPTIC MEDICINE AND LOTION obtained through any chemists, or Mr. HIBBERT Manchester.

THE ROBEY MINING ENGINE.



FROM 20 TO 200 EFFECTIVE HORSE-POWER.

FOR FULL PARTICULARS AND PRICES, APPLY TO—

ROBEY AND COMPANY, LIMITED,
PERSEVERANCE IRONWORKS, LINCOLN.

ALSO OF PATENT PORTABLE

HAULING & WINDING ENGINE

WITH
PATENT DRUM WINDLASSES,
FOR MINING PURPOSES.

This Engine is specially commended to Mining Engineers and others, as by its adoption—
Haulage along inclined drifts is easily and cheaply effected;
The expense of sinking new shafts is greatly reduced, neither foundations nor engine-house being required
It is available not only for winding, but for pumping, sawing, &c.—a great desideratum at a large colliery;
It can be very quickly removed (being self-propelling), and fixed in any desired position.
Prices and full particulars on application as above, and also references to view the engine in successful work near Derby, Carnarvon, Haverfordwest, Darlington, Durham, Penzance, and other places.

THESE ENGINES WORK WITH MARVELLOUS ECONOMY IN FUEL.

CHAS. PRICE AND CO.'S RANGOON ENGINE OIL,
AS SUPPLIED TO H.M. DOCKYARDS AND FLEET.



THIS OIL is suitable to every kind of Machinery. As a lubricant it is equal to the best Spermaceti or Lard Oil, while it possesses the great advantage of being entirely free from any principle which will corrode the metal bearings.

For particular kinds of Machinery, the Oil may be specially prepared of a consistency and character adapted to the nature of the work to be done.

"Chemical Laboratory, 7, Printing House-square, Blackfriars, April, 1868,
"I herewith certify that the Rangoon Engine Oil, manufactured by Messrs. Chas. Price and Co., is free from any material which can produce corrosion of the metal work of machinery. It is indeed calculated to protect metallic surfaces from oxidation.

"The lubricating power of this oil is equal to Spermaceti or Lard Oil.

"T. W. KEATES, F.C.S., &c., &c.
Every parcel of the Oil sent from the work bears the Trade Mark of the Firm.
LONDON: CASTLE BAYNARD, UPPER THAMES STREET.
WORKS: MILLWALL, POPLAR; and ERITH, KENT

THE "BURLEIGH" ROCK-DRILLING MACHINERY.

THOMAS BROWN,
PATENTEE AND SOLE PROPRIETOR.

THE "BURLEIGH" ROCK
DRILL.



Machine and Stand for
DRILLING and SINKING.

This celebrated ROCK DRILL, which by reason of its inherent merits has superseded all other Rock Drills, is now in extensive use in America, England, Scotland, and the Continent, and is indispensable in the economic working of all Railway Cuttings, Shafts, Quarries, and Mines.

Its prominent features are:—

I.—ITS SIMPLICITY.

Any labourer can work it, and it does not get out of order. It may be worked either by air or steam power, at will, without any alteration of the mechanism.

II.—ITS DURABILITY.

No part of the mechanism is exposed; it is all enclosed within the cylinder—so there is no risk of its being broken.

III.—ITS CAPABILITY.

In hard rock, like granite, gneiss, ironstone, quartz, the Tunnel Drill will progress at the incredible rate of 16 inches to 12 inches per minute. These machines can bore holes from 1 inch up to 5 inches in diameter, and, on an average, will go through 120 feet of rock per day—making 40 holes each from 2 to 4 feet deep. The drill can be used at any angle, and in any direction, and will drill and clear itself to any depth up to 20 feet.

IV.—ITS ECONOMY.

As compared with hand labour the saving in actual drilling is very considerable, from the fact of the "out put" being increased fourfold. The saving in the general expenses, and in the interest of capital, will be in a like ratio.

DRILL POINTS.

The saving in steel alone is incredible, ONE DRILL POINT WILL GO THROUGH TWENTY FEET OF ABERDEEN GRANITE WITHOUT SHARPENING. This fact will be duly appreciated by practical men.

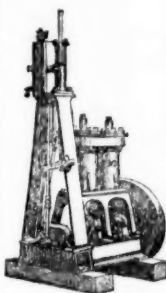
For testimonials, estimates, and other information, apply to—

T. BROWN & CO., Engineers, 96, Newgate-street, London, E.C.

WILSON, McLAY, & CO., Sole Agents, 2, Talbot-court, Gracechurch-street, London, E.C.; and 87, St. Vincent-street, Glasgow.

CRIVEN BROTHERS, Engineers (the Makers), Vauxhall Ironworks, Osborne-street, Manchester.

THE "BURLEIGH"
AIR COMPRESSOR,
THOMAS BROWN,
PATENTEE & SOLE PROPRIETOR.



For driving the "Burleigh" Drill, or other Machinery.

The peculiar advantages which enhance the value of this Machine in the estimation of those who have it in practical use are—

1.—The pump pistons are driven by a steam-engine, the connection rods being attached to one crank shaft, the angles being so set that when the greatest power is developed in the steam cylinder the point of the greatest compression is being reached alternately in the air cylinders.

2.—The heat generated by compression of the air is reduced to nil.

3.—It is strong and durable compared with its effective power.

For further particulars, and all information relating thereto, please address—

T. BROWN & CO.,

ENGINEERS,

96, NEWGATE STREET, LONDON, E.C.;

WILSON, McLAY, & CO.,

SOLE AGENTS,

2, TALBOT COURT, GRACECHURCH STREET, LONDON, E.C.;

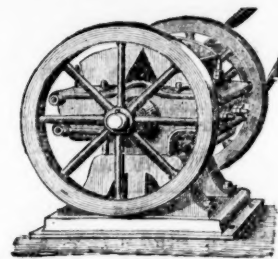
AND

87, ST. VINCENT STREET, GLASGOW.

CRIVEN BROTHERS,

THE MAKERS,

VAUXHALL IRON WORKS, OSBORNE STREET, MANCHESTER.



Machine No. 1—The Direct Double-Action.

IMPROVED

PATENT STONE BREAKING,
QUARTZ CRUSHING,
AND GRINDING MACHINERY.

Messrs. T. BROWN and Co., ENGINEERS, have much pleasure in calling attention to their IMPROVED MACHINERY for STONE BREAKING and QUARTZ CRUSHING, for crushing, grinding, or triturating Stone, Flint, Minerals, Ores, Chemicals, and other substances; for washing and separating Metals from Ores, and for extracting Gold from Quartz.

The principle of this invention is applied to machines of various construction, which contain within the range of their capability the power of reducing all hard materials to cubes of from 2½ inches to impalpable powder. The mechanical construction of each description of machine is specially adapted for its own peculiar work, and experience has shown that each is eminently suited for the work for which it is designed.

They can be driven by water, steam, or horse power; they are light and portable, and their crushing and grinding surfaces are so constructed that when worn they can easily be replaced.

If intending purchasers would send a sample of the materials required to be crushed or broken it could be operated upon in their presence, and thus they would be guided in the selection of the machine best suited for their requirements.

For prices, and all information relating thereto, please address—

T. BROWN & CO.,

ENGINEERS,

96, NEWGATE STREET, LONDON, E.C.

Or their representatives,—

WILSON, McLAY, & CO.,

2, TALBOT COURT, GRACECHURCH STREET, LONDON, E.C.;

AND

87, ST. VINCENT STREET, GLASGOW.

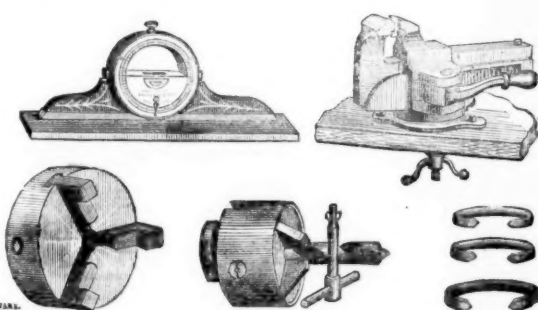
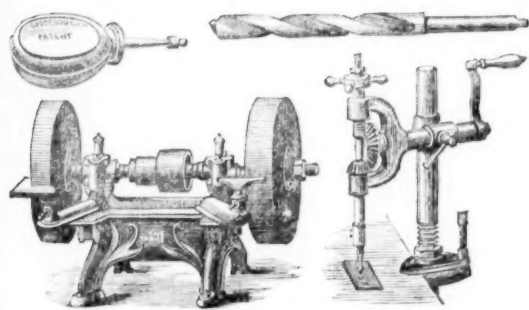
CHARLES CHURCHILL AND CO.,
IMPORTERS AND FACTORS OF AMERICAN MACHINERY AND TOOLS,
28, WILSON STREET, FINSBURY, LONDON, E.C.

SOLE AGENTS FOR

Morse's Twist Drill, and Machine Company's celebrated Twist Drills and Chucks; American Scroll Chucks; Stephens' Patent Vices; Parker's Patent Parallel and Swivel Vices; Gould Manufacturing Company's Well and Cistern Pumps; Washita, Arkansas, and Hindostan Oil Stones; and all other descriptions of American Tools and Machinery &c., &c.

C. C. and Co. are prepared to give quotations and execute orders for American Goods of all descriptions, to be shipped to any port.

CATALOGUES AND PRICES CURRENT ON APPLICATION.



SOLE AGENT FOR

GILLOTT AND COPLEY'S PATENT ROTARY COAL-CUTTING MACHINE,
LAUTH'S PATENT THREE HIGH ROLLS FOR SHEETS AND PLATES.

I. G. BASS, THE MACHINERY REGISTER OFFICE, BOW STREET, SHEFFIELD,
WHO WILL FORWARD PROSPECTUSES.
ENGINES, SQUEEZERS, &c., SPECIALLY DESIGNED FOR DANKS' PUDDLING FURNACES.

Established 1844.

WHITLEY PARTNERS,
RAILWAY WORKS, LEEDS,
ENGINEERS, FOUNDERS, AND LICENSEES.

MANUFACTURERS OF IMPROVED STEAM ENGINES, BOILERS, PUMPS, &c.
MAKERS, by Special Machinery, of PATENTED MECHANICAL INVENTIONS, comprising numerous Labour-saving Appliances and Economisers of Fuel and Motive Power.

CONTRACTORS TO THE EUROPEAN AND COLONIAL GOVERNMENTS AND CORPORATIONS.
MERCHANTS AND SHIPPERS OF MACHINERY, METALS, AND HARDWARE.

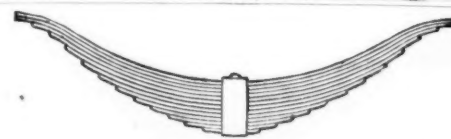
AWARDED

THE FIRST PRIZE MEDAL AT THE EXPOSITION UNIVERSELLE, PARIS, 1867, "For Improved Construction, Excellence of Material, and Superior Workmanship."
TWO GRAND GOLD MEDALS AT THE MOSCOW INTERNATIONAL EXHIBITION, 1872. THE FIRST PRIZE MEDALS AT LEEDS AND LYONS IN 1858, 1868, AND 1872.
AND THE MEDAL OF MERIT AT THE VIENNA EXHIBITION OF 1873, "For Excellence in Material and Workmanship, the Employment of Improved Tools and Machinery, and the Opening of New Markets."

REDUCTION IN PRICE OF PEET'S VALVES, CONSEQUENT UPON LARGELY INCREASED SALES.

ILLUSTRATED CATALOGUES AND ESTIMATES ON APPLICATION.

Correspondence conducted in English, German, and French.



THE
RAILWAY SPRING COMPANY,
MILLSANDS, SHEFFIELD,
MANUFACTURERS OF EVERY DESCRIPTION OF
RAILWAY SPRINGS.

ORE-DRESSING MACHINERY.

SEPARATION TROMMELS. JIGGING MACHINES.—Continuous and automatic. CLASSIFIERS. SHAKING TABLES. BUDDLES. PERFORATED PLATES.—For Trommels, Jigging Sieves, and Stamps Grates. SACH'S ROCK-DRILL.—As used at Altenberg, Comarn, Saarbruck, and Musen.

For particulars, apply to—

Messrs. KEMBER AND CO.
CLARENDON GROVE, DRUMMOND STREET, N.W., LONDON

BY ROYAL

H. R. MARSDEN,

LETTERS PATENT.

BLAKE MACHINE**ORE CRUSHERS, WITH THE NEW PATENT CUBING JAW.**

Has received 30 First-class Gold and Silver Medals.

750 NOW IN USE.

ALSO,

**NEW Patent EMERY CRUSHERS,
CEMENT CRUSHERS,
MACHINES for making GRAVEL
AND
ROAD METAL.**

COPROLITE CRUSHERS,

Small Handpower Machines for Crushing Samples, &c.

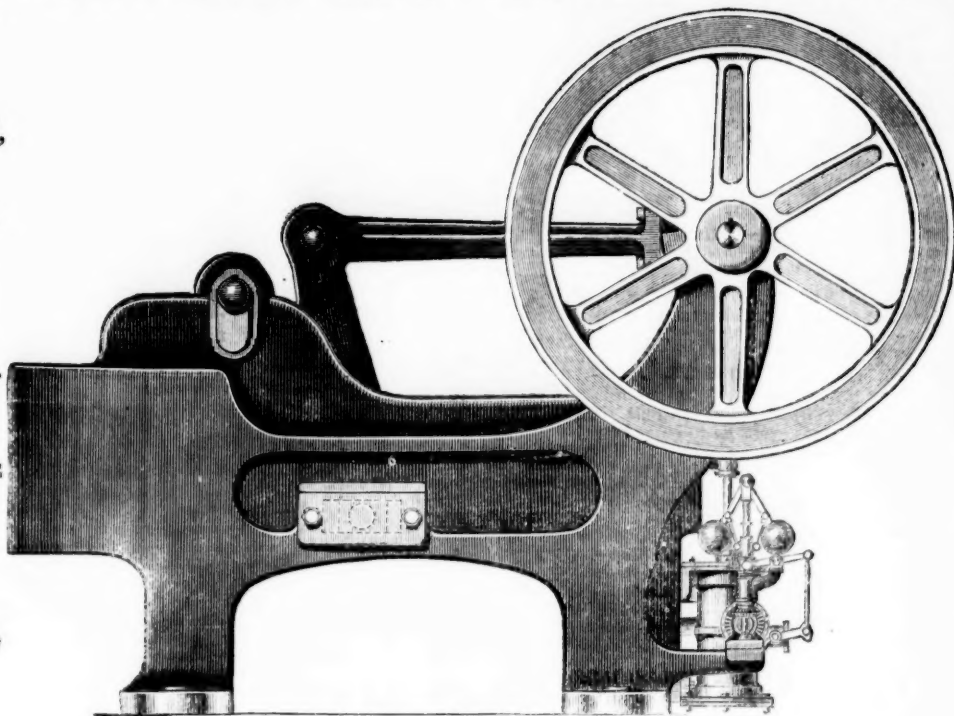
**SECURES FIRST-CLASS PRIZE MEDALS
WHEREVER EXHIBITED.**

ARE IN USE IN ALL PARTS OF THE WORLD. IMMENSE
SAVING OF LABOUR.

Users write—"It is a fascination." "A wonder." "Your Ore
Crusher is all that we could desire."

For illustrated catalogues, circulars, and testimonials, apply to—

**H. R. MARSDEN, Soho Foundry,
LEEDS,
ONLY MAKER IN THE UNITED KINGDOM.**



REFERENCE

ALL PARTS
OF THE WORK

NOW IN FULL

OPERATION

AT THE

LONDON

EXHIBITION

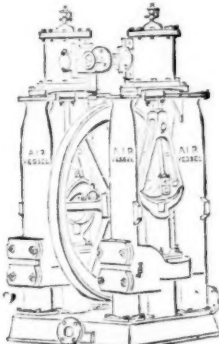
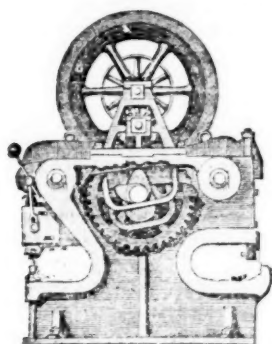
MACHINE

IN MOTION

DEPARTMENT

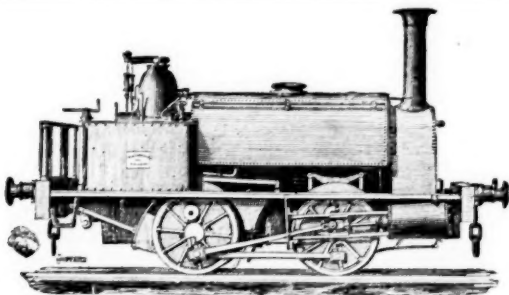
Stand 485

Class 14, Room

**JOHN CAMERON,**

MAKER OF

STEAM PUMPS, PORTABLE ENGINES, PLATE BENDING ROLLERS
BAR AND ANGLE IRON SHEARS, PUNCHING AND SHEARING
MACHINES, PATENTEE OF THE DOUBLE CAM LEVER
PUNCHING MACHINE, BAR SHEARS, AND RAIL
PUNCHING MACHINES,
**EGERTON STREET IRON WORKS,
HULME, MANCHESTER.**



**TANK LOCOMOTIVES,
FOR SALE OR HIRE.**

**HENRY HUGHES AND CO.
LOUGHBOROUGH.**

JOHN AND EDWIN WRIGHT,

PATENTERS.

(ESTABLISHED 1770.)

MANUFACTURERS OF EVERY DESCRIPTION OF IMPROVED

PATENT FLAT AND ROUND WIRE ROPES
from the very best quality of charcoal iron and steel wire.

PATENT FLAT AND ROUND HEMP ROPES,
SHIPS' RIGGING, SIGNAL AND FENCING STRAND, LIGHTNING CON-
DUCTORS, STEAM PLOUGH ROPES (made from Webster and Horsfall's
patent steel wire), HEMP, FLAX, ENGINE YARN, COTTON WASTE
TARPAULING, OIL SHEETS, BRATTICE CLOTHS, &c.

UNIVERSE WORKS, MILLWALL, POPLAR, LONDON.

UNIVERSE WORKS, GARRISON STREET, BIRMINGHAM.

CITY OFFICE, No. 5, LEADENHALL STREET, LONDON, E.

THOMAS TURTON AND SONS,

MANUFACTURERS OF

CAST STEEL for PUNCHES, TAPS, and DIES

TURNING TOOLS, CHISELS, &c.

CAST STEEL PISTON RODS, CRANK PINS, CON-

NECTING RODS, STRAIGHT and CRANK

AXLES, SHAFTS and

FORGINGS OF EVERY DESCRIPTION.

DOUBLESHEARSTEEL

BLISTER STEEL,

SPRING STEEL,

GERMAN STEEL,

Locomotive Engine, Railway Carriage and Wagon

Springs and Buffers.

SHEAF WORKS AND SPRING WORKS, SHEFFIELD.

LONDON WAREHOUSE, 35, QUEEN STREET, CANNON STREET, CITY, E.C.

Where the largest stock of steel, files, tools, &c., may be selected from.

**COAL-CUTTING MACHINERY.**

W. and S. FIRTH undertake to CUT, economically, the hardest
CANNEL, ANTHRACITE, SHALE, or ORDINARY COAL, ANY
DEPTH, UP TO FIVE FEET.

Apply.— **16, YORK PLACE, LEEDS.**

ESTABLISHED 1852.

WEIGHING MACHINERY.**HODGSON & STEAD, MANUFACTURERS**

Egerton Works & Hope Foundry, Salford, Manchester.

THE DIAMOND DRILL.**PROSPECTING OR TRIAL BORING FOR MINERALS**

The DIAMOND ROCK BORING COMPANY (LIMITED) is PREPARED to UNDERTAKE CONTRACTS at FIXED RATES
for PROSPECTING or BORING for MINERALS of all kinds. Great speed is attained; work that formerly took years is done
in the same number of months, and sample cores are brought up, showing the nature of the strata passed through, and enabling
minerals obtained to be analysed.

The company has a number of MACHINES in SUCCESSFUL OPERATION in different parts of ENGLAND, and the terms
with particulars, will be supplied upon application to—

THE SECRETARY, DIAMOND ROCK BORING COMPANY, LIMITED**2. WESTMINSTER CHAMBERS. LONDON. S.W****BOLTS AND NUTS. BOLTS AND NUTS**

MADE BY PATENT MACHINERY.

Suitable for Engineers, Millwrights, Coach and Wagon Builders, Colliery, and other Purposes.

AN EXTENSIVE ASSORTMENT OF OVER 200 TONS ALWAYS IN STOCK.

From which orders can be promptly executed. Every description of Bolts and Nuts made to order.

BAR IRON. BAR IRON

OVER 1000 TONS OF BARS, PLATES, SHEETS, ANGLES, HOOPS, SQUARES, ROUNDS, AND FLATS.

All of First-class Quality.

RAILWAY, COLLIERY, AND TRAM RAILS, TO ANY SECTION

A large Stock of Anvils, Vices, Ties, Irons, Smiths' Bellows, Files, Rasps, Picks, Spades and Shovels, Sledge and Hand Hammers,

Best Swedish Horse Nails, Back Bands, Plough Traces, Best Spring, Cast, Double Shear, and Blister Steel.

**JOHN STANSFELD (late Stansfeld and Sons), Iron Merchants, Bolts
and Nut Manufacturers,**

ALFRED STREET BOAR LANE, LEEDS.

THOMAS WARDEN & SON

LIONEL STREET, BIRMINGHAM,

IRON AND STEEL MERCHANTS

Manufacturer of Every Description of Railway, Colliery, and Contractors Plant

A LARGE STOCK OF SECOND HAND RAILS AND PLANT ALWAYS ON HAND.